

STUDIES IN QUESTIONED DOCUMENTS: NUMBER SEVEN

RELIABILITY TESTING

OF EXPERT HANDWRITING OPINIONS

BY
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San Francisco, California

Number Seven in the Series of
Studies in Questioned Documents

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DEDICATION

On April 21, 1992 Kathi de Sainte Colombe died, leaving a memory of a gracious and well respected leader in the handwriting analysis community. This study is dedicated to her memory, in the hopes that the good she has done ever increases in the lives and works of those who benefited by her teachings, example and guidance.

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THE PREFACE

The question addressed is how may the handwriting expert prove reliable the results of an examination or report before submitting it to the attorney/client. I have endeavored to use the terms "reliability" and "validity," along with their various related forms, in the standard meanings. "Validity" refers to the truthfulness, or the consensus of acceptability if you prefer, of a scientific principle or theory. "Reliability" refers to how accurate and believable is the application of that principle in the solution of a particular problem or in a specific technical application. Reliability may refer to the process used or a person's skill and performance in using that process.

For purposes of this paper, the reader is asked to accept the validity of handwriting science in general and of forensic handwriting analysis in particular. The reader is also asked to assume that we are discussing the operations of competent, reliable handwriting experts. It is the reliability of the actual application of the science to a particular case that we are testing. Testing the reliability of the particular practitioner will be discussed in my proposed monograph on cross-examining the handwriting expert. The foundations for the validity of the science are briefly mentioned in Sub-part 3.3.1.

Whatever way one might go about the task of reliability testing would also answer how may the handwriting expert best prepare for examination by an opposing attorney. Assuming the expert has been qualified to testify in a case, the critical test of one's believability is performance on cross-examination. The only sure way to defuse attacks by the cross-examiner is to have anticipated and addressed every possible attack beforehand.

We cannot actually anticipate all possible attacks upon our position; but we do wish to anticipate all which we reasonably can and to know that we can effectively reply to them. To do that we must have a complete grasp of the subject, a holistic methodology for examining the problem and a multi-faceted approach for testing our own opinion.

Therefor, this discussion comprises these major divisions:

1. The types of handwritten forgeries classified according to several methods;

2. The various kinds of questions these types of forgeries give rise to and how they may be best stated from the expert's viewpoint;
3. The requirements for a handwriting identification or non-identification and the terminology for expressing degrees of probability;
4. The different approaches one can use in examining a problem in questioned handwriting;
5. How each approach given can serve as a reliability test for each of the others;
6. Further reliability tests the expert might employ in order to verify the accuracy of one's own opinion; and
7. Illustrative cases.

Three questions of a more tentative and editorial nature are addressed in three appendices. Please consider them precisely that: Not just one appendix of maybe no defined value to the organism as a whole, but three such appendices, all of which could be excised without loss to the central thesis or to the development of the presentation. They are there simply due to a feeling of moral duty to the reader to share my outlook on related questions. I retain full right to change my mind completely on the opinions expressed therein.

I intend to address related questions in further monographs in this series of Studies in Questioned Documents. Principal subjects among these would be the expert opinion letter and report, preparation of questions for direct examination, impeaching the erroneous, incomplete or incompetent expert opinion, and methods of cross-examining an opposing expert.

There is only a selective bibliography to this monograph. The reason is that the texts supporting it have been cited in other titles which I have issued. Please refer to the following for further relevant material:

Witnessing to the Truth of Documents; an Index to Periodical Articles in English on Document Examination, Handwriting Expertise and Expert Testimony.

Forgery: Detection and Defense; a Guidebook for the Legal Professional.

Exemplars: Genuine Samples for Comparison with Questioned Writings and Documents.

I am in the process of researching a proposed study on probability, proof and inference in expert handwriting testimony. That study also will have bibliographic citations relevant to the topic of this present monograph.

There are three comments on the literary style of this monograph that I should like to make. First, I have been reading authors from the turn of the century, such as Daniel T. Ames, William E. Hagan and others. Their florid style has intruded into my usual sparse and direct expression. Bear with me while I work the influence out of my system, and I promise to reform for the next piece I produce.

Second, I am attempting to address several related topics in several separate monographs. This perforce results in gaps in this work as the discussion touches on a related topic. Yet I feel it imperative to stress the limits between topics so that the reader, particularly the novice in the field, is not lulled into thinking all pertinent information has been given.

Third, the literature discusses many concepts, but authors do not define those concepts precisely. Few offer any definitions at all. I offer definitions of these terms based on what I believe to be a consensus of meaning derived from the usage of such terms by various authors. If readers know of authors who directly and precisely discuss the meaning of such terminology, I would be grateful if they would inform me of the relevant works. Meanwhile, the definitions I offer should be considered as preliminary and working definitions, until peer review and further discussion in the literature brings forth a consensus.

Special acknowledgment is due to many people who lent assistance, evaluations and suggestions in the writing of this text. The virtues of the discussion owe much to their input; the faults which remain are of my own doing. My apologies go to those I fail to mention, solely due to the fact that the mentioning of every person to whom I owe a debt of gratitude with a description of the cause of that debt would require more space than that occupied by all my writings in the field to date as well as in whatever future time is left to me.

Patty Garelick and Maggie Brosnan are always graciously willing to proofread.

R. T. Moore of Derwood MD reviewed the first draft and critiqued it with his usual perception and ability to identify central questions as well as discussions that diverge

from the essential topics.

Dr. Hooper Williams of Campbell CA has demonstrated in his scholarly and gentlemanly nature how disagreements in philosophical and scientific outlook in no way limit personal respect and the sharing of ideas. He continually challenges me to consider different outlooks and restate my own position in the new light gained by doing so.

Robert Backman, Curator of the Handwriting Analysis Research Library in Greenfield MD, made a literary critique of the first draft. If they ever institute a Pulitzer Prize for esoteric monographs like this work and I receive it, it belongs to him. It is surprising how minutiae in literary expression make major differences in the overall quality of a writing.

Many colleagues have off and on shared their ideas on the topics discussed in this monograph and have kindly listened to mine. Among a whole litany of such good people are Robert J. Phillips, Kathy and Bill Koppenhaver, Ted Widmer, Nancy Cole, Robert Stettler, M. Patricia Fisher, Bette Bennett, Linda Fisher, and all those who have attended my various workshops and seminars. The latter have taught me as much, if not more, than I have taught them.

Lastly, all who have purchased my publications have inspired me to set new standards for myself and work to offer higher quality productions. How else can one repay such an honor: Another human expends not just money, but time and thought on one's writings, time the most precious of our earthly possessions and thought the most divine of our human qualities?

I thank all of you and hope this work merits such friendship and gifts as you have given to me.

SECTION ONE

TYPES OF FORGERY

1. TYPES OF FORGERY

At the 1991 Conference of the National Association of Document Examiners in Santa Monica, CA, Ms. Judith Houseley of Santa Fe, NM gave an instructive presentation. She described various types of handwritten forgeries. Her list differed from that which I had learned from the literature, yet it made as much sense. Then it struck me that what each list of types lacked was a single principle of classification.

Applying different ways of approaching the problem of classification, I came up with the following method by which we can rearrange all the forgeries into alternative types, obtain a wider understanding of the matter and enjoy a versatile but reliable approach, depending on the nature of the problem at hand.

Please bear in mind that as document examiners we do not determine forgery. Such a determination is a legal question, appropriate only for the court to make. Technically, we merely determine whether or not a given handwriting is false or authentic. Many false writings may be perfectly legitimate and therefor in no way forgeries. Yet to conform to customary practice, I will use the term forgery when what I am discussing is technically only falsity in handwriting.

1.1 CLASSIFICATION BASED ON THE MODEL USED.

1.1.1 Simple forgery or spurious forgery.

The writer uses own authentic style as the model.

1.1.2 Imitation forgery or simulated forgery.

The writer uses another person's authentic style as the model, though that may be only what the maker of the forgery believes to be the other's authentic style.

1.1.3 Disguised handwriting.

The writer uses some fictitious style as the model; however, that model must necessarily be a style known to the writer and to some degree within the writer's skill of execution. For example, I could not disguise my writing in Icelandic school model style, since I have not yet seen it.

1.1.4 Traced forgery.

The writer uses a specific piece of writing believed to be authentic.

1.1.5 Physical transference from authentic.

Again the writer uses a specific piece of writing believed to be authentic. Most often it is an authentic signature which is fraudulently added to the false instrument.

1.1.6 Forgery added to the authentic.

Technically the authentic writing is not a model, but is incorporated into the forged instrument. Usually a false text is placed above an authentic signature.

1.1.7 Mixed types.

One can mix or match all of the above in any number of combinations and dominance by one type or another.

1.2 CLASSIFICATION BASED ON FREQUENCY OF PERPETRATION.

1.2.1 Habitual forger.

When a person is a professional forger, one might say his forgeries are made in the ordinary course of business.

1.2.2 Opportunist.

The person makes the forgery only as the occasion arises, in that it seems profitable or an easy way out of a difficulty that seems free from discovery.

1.2.3 Specific occasion.

An example would be the school child playing "hookey" one time and having a friend write the pretended note from mother. If it is easy and works, one might be tempted to step up to opportunist and gradually slip into a habit.

1.3 CLASSIFICATION BASED ON THE SKILL OF THE MAKER.

1.3.1 Very skilled: Professional forger.

Above we defined the habitual forger as professional. Here we require that the person be very good at it to be considered professional. Thus each different classification gives us another viewpoint.

1.3.2 Unskilled: Amateur forger.

1.3.3 Degrees in between.

1.3.4 There are three possible definitions of "skill."

1.3.4.1 Mastery of the school model.

Most document examination authors seem to use this definition. In making a forgery such skill is useful only for imitating persons adhering to the same school model, lacking individuality and originality. The school model is the standard alphabet and the proper method to write it which prevail in a given educational system. To consideration of the school model should be added, for document examination purposes, all other common writing patterns derived from a mutual occupation or familial ties. I call common writing patterns derived from the school model primary class characteristics. I call common writing patterns derived from other influences secondary class characteristics.

Primary and secondary class characteristics cannot be taken as individually identifying but only as supporting the basis for suspicion. They might, however, serve to support non-identification if unexplainably absent.

1.3.4.2 Degree of originality and fluency.

This is true graphic skill, or "graphic maturity" as Saudek states it. The larger the unit of writing which the person can execute without having to pause in order to consider mechanical requirements, the more graphically mature the writer is. This graphic maturity is the best safeguard against the fraudulent imitation of one's handwriting.

1.3.4.3 Ability to imitate.

Of the three, this is the skill needed in a good forger. The forger's own handwriting could well lack evidence of the first two kinds of skill. In fact, it seems that the most successful professional forgers have nondescript handwritings, thus requiring little effort to suppress individual characteristics and making it harder to make a personal identification through comparison with the authentic writing.

1.4 CLASSIFICATION BASED ON THE PURPOSE OF THE FORGERY.

These types concern legal questions; thus they are not within the province of the document examiner. They are listed for the sake of completeness.

1.4.1 Without fraudulent intent; thus not legally a forgery.

1.4.2 To obtain some right or benefit.

1.4.3 To impose some liability.

1.4.4 For temporary deception, particularly because the perpetrator will obtain money or other benefit and then leave the area.

1.4.5 For permanent deception, because the perpetrator remains in the area, as when someone obtains his residence through forgery.

1.5 CLASSIFICATION BASED ON THE TYPE OF INSTRUMENTS.

For purposes of this discussion, the type of instrument is irrelevant. Again, the list is given for the sake of completeness.

1.5.1 Real estate documents.

1.5.2 Wills and codicils.

1.5.3 Negotiable instruments in general.

1.5.4 Particular negotiable instruments, such as checks, bonds, charge slips, etc.

1.5.5 Currency and coin: Counterfeiting.

1.5.6 Art objects and collectibles.

1.5.7 Commercial products.

1.5.8 Other documents.

Our list is potentially infinite, and some of the types of forgery we could list would properly be investigated by criminalists other than a document examiner.

1.6 THE MATERIALS OF WHICH A FORGERY IS MADE.

Each material aspect of the document would have many subdivisions. The four main things that we must consider are paper, writing tool, writing medium, and method of arranging the different pages or parts.

1.6.1 The paper.

Subdivisions could be made by manufacturer, composition (rag, tree cellulose, linen, etc.), intended usage or purpose (lithography, xerography, laser printer, ink writing, offset, etc.), sizing or surfacing (also related to purpose; photographic emulsion, zinc oxide, clay, etc.), manufacturing process (hand-made, various machine processes), mechanically produced traits (watermarks, surface textures, etc.), and trace chemicals present (coloring agent, trace elements from bleaching, washing, etc.).

1.6.2 The writing tool used in making the writing.

Subdivisions would include pen, pencil, typewriter, photocopier, offset printer, etc., further divided by manufacturer, and other possible subclassifications.

1.6.3 The medium for the writing.

We would have ink, tagging chemicals, graphite lead, toner, paint, etc., each further distinguished by manufacturer, bulk components, colorants, and other possible subclassifications.

1.6.4 The method of arranging parts.

Staples, binding, adhesives, envelopes, etc., each further distinguished by manufacturer, and other possible subclassifications.

1.7 FINAL COMMENTS.

Each method of classifying forgeries provides important information for testing purposes. The human mind best re-evaluates something by taking an entirely different approach to it. These methods of classification will provide us with six such approaches. One would adopt the method most congenial for one's way of thinking when first approaching a problem. One would take the method most opposed to one's ordinary ways of thinking when re-evaluating the opinion arrived at, or when preparing for cross-examination.

Note that very few of these logically distinguishable types have special names. We refer to most of them by what is forged, the business suffering the forgery, the means of forgery, or the materials involved. Thus we speak of "check forgery," "real estate forgery," "forgery by photocopy," "ink problems" and so on. A logical and scientific classification can expand our understanding of what we are dealing with, suggest new lines of inquiry and research, and provide a new framework in which we can conduct and explain our work.

SECTION TWO

HOW QUESTIONS MIGHT BE POSED TO THE EXPERT

2. HOW QUESTIONS MIGHT BE POSED TO THE EXPERT

We will take the various methods of classification in the previous section in order to see how each will assist in stating the problem in the best way. The way we state a problem often predetermines how we will solve it, as well as how we might be blocked from solving it. Often when we find a problem unsolvable, the next essential step is to redefine the problem completely. Only if we know the ways in which our problem can be redefined are we able to know that we are indeed asking the right question, as well as the entire question, which must be answered.

Another consideration: If we simply accept an opponent's statement of the problem, we necessarily accept the assumptions underlying that statement of the problem. By redefining the problem we help expose the unstated assumptions. Only when the assumptions, which we or our adversaries are laboring under, are clearly recognized and stated, can we hope to resolve the conflict in the light of truth.

At the start we do not know through investigation, but may believe through supposition or reliance on the opinion of an interested party, what type of forgery we face, or whether or not we indeed face a forgery. Rationally, we should systematically ask all questions raised by all types of forgeries under every classification.

Only if verified observation eliminates a possibility, should we ignore the questions which that possibility might raise. Therefore, whether during the investigation or during the testing process, ideally we ought sooner or later to ask ourselves all the questions posed. By knowing and mastering the ideal we can later establish the practical limits of such an all-consuming process.

Two questions should be asked for each type of forgery under each classification. First, what indications would definitely exclude consideration of this type of forgery? We learn what such indications are by studying the pertinent literature, particularly reports of primary research.

Second, while we do not determine legal questions relative to authenticity or falsity, are there any relevant legal questions which we might bring to the attention of the attorney/client? We learn these things through study of the legal literature concerning the elements of forgery and its prosecution as well as of the liability of various parties for false instruments. Both of these questions are beyond the scope of this study. Be certain not to appear to be giving legal advice when broaching these considerations.

2.1 CLASSIFICATION BASED ON THE MODEL USED.

2.1.1 Simple forgery, spurious forgery.

Are the signs of a spontaneous, genuine writing present? Does the suspicious writing appear identical in authorship when compared to authentic writings by any of the potential suspects? Does linguistic analysis point to any potential suspect? In applying research into psychological factors in the choice of fictitious names, do we find a pattern fitting the real name of any potential suspect?

2.1.2 Imitation forgery or simulated forgery.

Are any of the indicia of forgery present, particularly those peculiar to imitated writings? What authentic writings by the victim might have served as models and who had access to them?

The following questions are to be asked also for the remaining types of forgery in this classification.

Where does any dominant characteristic change? Is there indication of spontaneous authentic writing in any portion or feature of the writing, particularly the less conspicuous ones? Do any of the authentic exemplars of potential suspects indicate the requisite graphic skill? Do the less conspicuous portions and features of a suspect's exemplars agree with the same portions and features in the suspicious writing? Have I made assumptions concerning the alleged falsity or who might have made the writing, particularly based on representations by the person paying me? How might I independently verify or disprove such assumptions?

2.1.3 Disguised handwriting.

Are any of the indicia of forgery present, particularly those peculiar to disguised writings? Do the indicators for particular types of disguise appear: Slant; Size; Opposite hand; Unaccustomed style; Printing, especially block capitals; and the other less customary disguises?

If it is a poison-pen writing, are we being sure to include the victims among our potential suspects? Does linguistic analysis point to a particular suspect? Is there use of vocabulary, grammar, spelling, etc. which appears either awkward or not customary with the writer or employed inconsistently? No matter how irrational it may seem, what could be the psychological payoff and motivation?

2.1.4 Traced.

Are any of the indicia of forgery present, particularly those peculiar to traced writings? What method of tracing might have been used? What authentic writing might have served as a model? Which potential suspects had access to or possession of writings which could have served as a model?

2.1.5 Physical transference from authentic.

Which method was used, such as photocopy, transparent tape transfer, physical composition from several documents? What technological tool might identify a composite: UV or IR light, chromatography, or other? What was the original source of the authentic? Which potential suspects have the technical knowledge and skill to make the transference and also had access to the needed materials and equipment?

2.1.6 Forgery added to the authentic.

The questions in 2.1.5 above are relevant here. Is there any indications that one part of the document might have been made at a different time, by a different person or with a different writing tool or process than any other part? Assuming one part is authentic, what might account for the occasion or purpose of its original making, such as supposed autograph collecting?

2.1.7 Mixed types.

The only way this can be determined is by the separate determination that two or more types of forgery are present. Only if one type of forgery necessarily excludes some other type from being present in any portion of the suspect document, could one conclude that there is not a mixture of forgery types.

Thus we must be careful not to let a discovery of falsity blind us to the possibility that more falsity of the same or of a different kind is present.

In that same vein, the discovery of authenticity in any one feature or portion does not prove authenticity in any other feature or portion. Only the careful and thorough testing of every possible indication of every type of falsity will logically support a very probable finding of authenticity. How can any of us know all possible tests for all potential forgeries? We must state authenticity only of the specific feature or portion of the document we thoroughly examined; then we must qualify our finding as relative only to the material submitted for examination and the examination made and reported.

Finally, we may have definitely proved a specific feature or portion of the document is false, but it is not for us to state that the document itself is an operative instrument or is legally invalid. An example: A husband may have signed his wife's name; yet, if she gave her prior permission or afterwards consented to the benefits she realized from the document, the signature is graphically false but may still be legally enforceable.

2.2 BASED ON FREQUENCY OF PERPETRATION.

2.2.1 Habitual forger.

Do similar documents before and after the date of the suspect document show similar suspicious signs? If there is a series of forgeries, do the times and places fit with the itineraries of any of the potential suspects? Assuming it is one of a series, is this a case of interest to State or Federal authorities who might also have information which could help the examiner?

2.2.2 Opportunist.

Who might gain an actual benefit from the forgery? Who might gain a psychological benefit, however irrational it may be?

2.2.3 Specific occasion only.

Since the best protection the forger has against detection is the virtually random nature of the offense and the customary acceptance of documents on face value, some circumstantial event has usually raised suspicion. For that reason general questions do not easily come to mind, except that the examiner would draw from questions listed under other appropriate categories. Also refer to works, such as my *Forgery: Detection and Defense*, which give the indications that could rouse suspicion about the authenticity of documents.

2.3 BASED ON THE SKILL OF THE MAKER.

2.3.1, 2.3.2, 2.3.3 Very skilled, Unskilled, Degrees in between.

We must define the kind of graphic skill we are considering and formulate our questions from that viewpoint.

2.3.4 The various definitions of "skill."

2.3.4.1 Mastery of the school model.

Do we know the age and nationality of the writer? Do we know the place where the writer was educated? Does the writing give indication of the national or regional school model the writer was taught? Is the writer using a first or second language, and at what age was the second language learned? How well has the writer mastered the school model, how slavishly does the writer adhere to the school model, in what feature if any does the writer show originality, and what are the inconspicuous but individualistic peculiarities of the writing? Does the writer give any indication of graphic ability beyond the school model?

2.3.4.2 Degree of originality and fluency.

Does a suspect have the degree of graphic skill needed to execute the questioned writing? Does the questioned writing show a degree of graphic skill beyond that evidenced by the alleged writer? Precisely in which features and to what degree does the writing diverge from the school model?

Bear in mind that a writing can be so creative or bizarre that all trace of the original school model has been lost. Also remember that, however far the writer diverges from the class characteristics previously used, those characteristics remain today within the scope of the writer's potential. Likewise, a writer may well have progressed from one original habit to another, each still being available for fraudulent use.

Therefor, have we obtained older exemplar writings which might indicate prior graphic habits and skills of the potential suspects? Lastly, have we examined

all eight categories of handwriting features and not merely various aspects of form and style?

The eight categories of handwriting features are: Speed; Arrangement, covering use of space in margins and between lines and words; Form or Style; Continuity and Form of Connection, including use of space between letters within words; Size and Proportion, including ratios between letters and use of space within letters; Pressure, including both grip and penpoint pressure; Slant, which is the angle letters have to the base line; and Base Line.

Please note that each category is an aspect of the entire piece of handwriting. It is analogous to viewing a stained glass window from one side and then the other. In each instance one sees the entire window and each of its panels, but sees it in a different light. For a fuller description of these categories and their value for handwriting identification, see my publication: *Forgery: Detection and Defense; a Guidebook for the Legal Professional*.

2.3.4.3 Ability to imitate.

Does the suspect's own handwriting lack individuality in conspicuous features? In inconspicuous features? Again, are there available exemplar writings from prior years? We would want to collect exemplars from as far back and from as many periods of life as possible. Are there available questioned writings from other unsolved cases to compare with this one? Do any of the potential suspects fit the profile of a professional forger as established by research reported in the professional literature?

2.4 BASED ON THE PURPOSE OF THE FORGERY.

The questions to be asked can be found in many guides to investigations of questioned documents. In my *Forgery: Detection and Defense*, there are lists of clues to suspicious documents and of questions to ask of claimants, opponents and witnesses. Since this study is focusing on handwriting identification, those questions will not be repeated here.

2.5 BASED ON TYPE OF INSTRUMENTS.

Since, as stated above, this study focuses of handwriting identification, I will only give general questions applicable to various types. Consult specialized treatises for a particular type of document. Ethically, and perhaps legally, the examiner may be obligated to refer specialized problems to appropriate specialists or to law enforcement agencies.

Precisely how, and how not, are available exemplars comparable to the questioned document? Where might fully comparable exemplars be obtained, and from whom? Do exemplars which are not fully comparable nevertheless indicate the graphic ability needed to make the questioned writing? What writing traits of the maker seem peculiar to the particular type of document in question? What writing traits seem common to all types of documents? We especially look to inconspicuous features to answer this last question and to conspicuous features to answer the previous one.

2.6 THE MATERIALS OF WHICH A FORGERY IS MADE.

As mentioned above in other connections, identification of materials is beyond the scope of this study. The questions then are concerned with how materials might have affected the resulting handwriting. These questions are the third area of inquiry concerning handwriting identification that the examiner must make, the first being a precise statement of the purpose and nature of the commission undertaken, and the second being an assessment of the quality of questioned and exemplar documents as appropriate specimens for the examination to be made.

2.6.1 The paper.

Was the paper appropriate for the writing tool and medium? Did the writing tool either become hung up or skid on the paper's surface? Did the paper repulse or unduly absorb the medium? Was the paper damaged prior to the writing, such as by folding or soiling? Was the handwriting damaged after being made so as to distort its features? Are there exemplars made on comparable paper? What relation does the questioned writing have to other machine-produced or handwritten material present on the same document?

2.6.2 The writing tool.

Some of the questions in 2.6.1 above are applicable. How accurately can we determine the writing tool used, either from examining the writing or asking a witness to the making of the document? Was it the writer's customary or preferred tool? Are there writing characteristics showing hindrances or disturbances caused by use of the writing tool?

You can learn how to suspect such things by experimenting with having writers use a range of writing tools from their most choice to the most distasteful and difficult for them. What ease or difficulty of movement does the tool cause? What were the defects of the tool?

2.6.3 The medium for the writing.

The questions in 2.6.1 and 2.6.2 are applicable. Most often we consider the writing medium and writing tool as one thing. However, there are innumerable types of pencils with innumerable types of lead; the same goes for other types of writing

tools. By asking the same questions specifically of the writing medium as we did of the tool, we are alerted to think of different details and possibilities.

Was the medium appropriate for the tool? An example of an inappropriate medium for a tool is the time I mistakenly put India ink in my fountain pen. Likewise a Chinese writing brush requires the ink specifically designed for it in order to produce proper results. Is there indication of a multiplicity of mediums? The technical investigations of writing papers, tools and mediums is outside the scope of this study. Each of these topics merits a full book.

2.6.4 The methods of arranging parts.

Most of these methods are also beyond the scope of this study. The document examination literature has many papers on specialized aspects such as staples, adhesives, bindings, seals, and envelopes, just to mention the most common topics. A few can have a direct effect on the handwriting and thus alter or mask the identifying characteristics. The major ones only will be mentioned.

2.6.4.1 Carbon and carbonless copies never have the minute detail of the original. And originals written over carbon copies have a different underlying surface than normal writings. The writer might well alter the style and pressure pattern of the writing when concerned that numerous carbons come out legibly.

Extreme caution must be exercised in comparing unrelated carbon, carbonless and original documents to each other as exemplars for purposes of identifying the writer. Any non-writing pressure might mark the carbon copy without leaving a trace on the original. How can we be sure which marks on the carbon copy are from the graphic movement and which are not?

2.6.4.2 Indented writing into an underlying sheet of paper offers all the same and even more problems than carbon copies do. First, have we really developed the indented writing enough to say there are sufficient details for a definite or even strong probability of identity? Remember that it is the inconspicuous features which are the most significant notes, and these are precisely the ones most lost in the thickness of the paper.

Second, are regular writings truly comparable exemplars, or should we compare proven indented writings to questioned indented writings? Maybe indented

writings only permit a probable identification or circumstantial evidence that must be used in conjunction with other evidence.

2.6.4.3 A preprinted form, even regular lined writing paper, may alter the writer's normal sense of spacing. Can we safely assume that the word or letter spacing will not also be altered, not to mention all the other graphic features?

SECTION THREE

HANDWRITING IDENTIFICATION

3. HANDWRITING IDENTIFICATION

3.1 IDENTIFICATION THEORY IN GENERAL: DEFINITION.

3.1.1 We can define an expert identification or non-identification as a probable or better conclusion, either positive or negative, based on verifiable and significant notes, supported by established scientific theories and findings, and subject to demonstration.

3.1.2 This definition raises questions which must be discussed. What supports degrees of probability in the expert opinion? What are appropriate terms for expressing the probability of an expert handwriting opinion? What are methods for verifying the expert's observations, principles of interpretation and conclusions? What determines whether an identifying trait, called a note, is significant or not? Are there generally accepted scientific theories for handwriting identification, and, if so, what are they? Are there primary research projects validating those principles of identification and where are they cited? What are the legal, rhetorical and scientific guidelines for demonstrative proof of handwriting opinions?

3.1.3 Several of these questions are properly the subject of studies other than this one. The discussion will therefor be limited to the analytical process (3.2.1), the nature of identifying notes (3.2.2), controls for comparison (exemplars or standards, 3.2.3), and the elements to be included in an expert statement (3.2.4). Then will follow a discussion specifically on the unique character of handwriting identification (3.3).

3.2 IDENTIFICATION THEORY IN GENERAL: DISCUSSION.

3.2.1 The analytical process.

To be a thorough-going scientific analysis the process must meet certain requirements. If any of these are missing or unsatisfactory, the resulting conclusion must be qualified and might be impeachable. The most prudent way to avoid that is to proceed systematically so that each requirement is a logical next step.

3.2.1.1 The examiner should restate the identification problem to be investigated in a clear, concise manner consonant with the technical requirements of the applicable forensic discipline and have that statement confirmed by the person asking that the investigation be made.

3.2.1.2 The material to be identified should be determined as proper or not for the type of examination requested. The same determination is made of the controls.

3.2.1.3 The necessary tools, materials and procedures are determined and verified as available to the examiner. Others are determined as useful or useless. It would simply be incompetent or unethical to undertake useless tests and procedures and possibly unethical to undertake the useful but unnecessary without justification.

3.2.1.4 The necessary observations to be made of the questioned material are listed in a logical order and systematically checked and recorded. These are the data, the identifying notes. The same observations are made of the controls.

3.2.1.5 The applicable scientific principles of interpretation and identification are listed and applied to the data from 3.2.1.4, first to the questioned material, and then to the controls.

3.2.1.6 The results obtained from the questioned material are compared with the results from the controls. The similarities and dissimilarities are determined.

3.2.1.7 Evaluation of similarities and dissimilarities leads to an identification if the similarities are significant and if the dissimilarities are insignificant or reasonably explainable. Contrariwise, it leads to non-identification if the dissimilarities are significant and if the similarities are insignificant or reasonably explainable. The term "significant" is defined under Sub-part 3.2.2.

A "reasonably explainable" significant difference is one which we would expect to be similar if the identification is correct, but which is not similar; however, for the hypothesis of our identification to be correct, we must offer an established principle from handwriting theory which accounts for both the significant difference and the pertinent facts of the making of the document. For example, suppose that we identified a signature with cramped forms as made by a person whose exemplars show large and open forms and that our client alleges that it was written in extreme cold. One experimentally verifiable handwriting theory is that extreme cold is a cause of cramped writing. That makes the difference reasonably explainable within the context of our hypothesis. Any contrary opinion, which cannot reasonably account for both the cramped writing and the similarity of features on which we have based our identification, would not be tenable.

3.2.1.8 The examiner employs the proper reliability checks in order to verify the findings and conclusions.

3.2.1.9 The examiner states the findings and conclusion in appropriate form and submits them to the person who requested the examination.

3.2.2 The nature of identifying notes. A note can be defined as an observable, verifiable and characteristic trait significant for identification.

By "observable" is meant something that can be seen, described, tabulated and reported. By "verifiable" is meant something that another person can see, describe, tabulate and report with the same results as the first person obtained. By "characteristic" is meant something which appears repeatedly or in a pattern with other things or in a singularly unique manner. By "trait" is meant what can be specifically defined as belonging to a class of empirically predetermined features subject to rules of observation and principles of interpretation.

The term "significant" is much harder to define. No author, whom I have read and

who mentions the need for significant traits in identifying handwriting, defines the term and discusses what factors make a trait significant. The exception is Robert Saudek, who, without using the term, states precisely which traits he considers significant and insignificant for identification and why. "Significant" means a thing which either should contribute positively to the identification of a writer or must be reasonably accounted for if it does not, because experimentally established theory indicates it should be consonant with authentic writings. Saudek says that the inconspicuous features are those significant for identification. Inconspicuous features in handwriting are those which experimental research has shown escape the attention of the writer unless pointed out to him or the writer is asked repeatedly to notice another feature.

3.2.2.1 A note must be an observable and verifiable trait. It should be measurable in accordance with the principles and procedures of the applicable discipline. It ought not be a matter of subjective opinion or intuitive evaluation. As one who has written poetry, I do not discount the importance of subjectivity and intuition in a human and humanistic life, but in a forensic problem only objectively verifiable facts can establish a firm foundation for settlement of disputes.

3.2.2.2 A note must be a trait proven to be characteristic of the material or control. For example, in handwriting identification such things as a stray ink mark, writing tool problem, random interference while writing, an assumed style, and so forth should not be taken as notes. The following would be some of the kinds of characteristic traits: An often repeated trait; a habitual use of a combination of two or more traits; a pattern in the way a trait is altered; a singularly unique occurrence which is rare among writers.

3.2.2.3 A note should have a demonstrated statistical occurrence in the population to which the questioned material and its maker belong. This need not be the result of extensive or precise statistical studies, but reasonably established through experimentation or experience. Do not claim a precise numerical expression of statistical occurrence which is not founded on precise studies. Lacking a controlled and precise statistical study of the occurrence of a graphic feature in a defined population, one should keep one's estimates on the conservative side.

3.2.2.4 The relationship of a given note to all other notes relied upon should be

stated. They must have a mutual independence of occurrence, at least in so far as that they need not always occur together. The more mutually independent their occurrence is, the more cogent their co-presence is for supporting identification. On the other hand, when they tend to occur mutually, if they are not consonant with each other we must provide a reasonable explanation for that fact since it lends support to the opposite opinion.

3.2.2.5 There must be a sufficient number of notes to support the degree of certainty expressed. This certainty may be estimative as versus mathematical, that is, there are degrees of probability.

"Sufficient" is another concept in handwriting identification which is not precisely defined in the literature which I have read, and that covers several hundred books, monographs and journal articles. In fingerprint identification twelve points of similarity in features of a given quality seem to be the norm. Such a numerical standard cannot be applied in handwriting identification; because, whereas fingerprints are a physically determined and constant feature of a person and are thus subject to extensive statistical verification over large populations, handwriting is a behavioral, and in part volitional, activity as well as an established habit with elements of which the writer is unaware. So what might a fully "sufficient" agreement between questioned and exemplar samples be?

First, we must obtain the amount and quality of exemplars which the literature indicates are necessary for the comparison to be made. Second, I believe we are not to identify any specific number of features, but rather we must identify this entire graphic activity as being by a particular person. Third, if, for example, we bring forth similarities in form to prove our opinion (and in actual practice that is what most practitioners seem to do), we must be able to bring forth an equal level of proof when we consider any of the other seven categories of handwriting features. Fourth, if we cannot do that, we must either offer reasonable and scientifically supported explanations why not or modify our opinion accordingly. Fifth, our opinion should be able to account for all the relevant facts within the context of our hypothesis.

To the degree that any one of the five requirements is not fully met, there is an insufficient agreement. Consequently the opinion would have to be qualified.

3.2.2.6 Whatever the degree of certainty for a conclusion of identification which the cumulative effect of the notes supports, an at least equally certain conclusion for non-identity should result when any alternative suspect is considered. This itself is a reliability check.

3.2.3 Controls for comparison. Number four in this series of Studies in Questioned Documents treats handwritten exemplars at length. Here we will look at the minimum consideration needed for purposes of reliability testing.

3.2.3.1 For forensic purposes a control, also called an exemplar or standard, is defined as an authentic sample acceptable or provable to the court as such and as valid for comparison with the questioned material in terms of the exact kind of identification which is in question.

3.2.3.2 The principal scientific qualities needed in the control is that it be of the same nature as the questioned material, made of the same materials as the questioned material, and exist prior to the rise of the dispute or be made afterwards in accordance with pertinent, pre-established guidelines. For a thorough discussion of the scientific and legal qualities required in a control sample, see my monograph, *Exemplars: Genuine Samples for Comparison with Questioned Writings and Documents*. The bibliography in that work is very extensive and refers to papers by the major authors in the discipline.

3.2.3.3 The chief legal quality needed in a control is that it meet all the requirements for admissibility. The expert should be more than familiar with the relevant laws and rules of court. Refer to the annotated codes for the jurisdiction in which you are to give testimony.

3.2.4 Elements of an expert statement.

Generally these comprise the outcome of the various steps of the analytical process.

3.2.4.1 A statement of the problem investigated.

3.2.4.2 Identification of each questioned and exemplar item examined.

3.2.4.3 Description of the procedure used, tests made and the scientific preference for their use in the type of examination made over any alternative

procedure. If our procedure for forensic handwriting examinations systematically includes all possible queries, we need not be concerned about some alternative procedure.

3.2.4.4 Pertinent characteristics of the questioned material.

3.2.4.5 Pertinent characteristics of the control materials.

3.2.4.6 A comparison of the two sets of pertinent characteristics; that is, the notes.

3.2.4.7 The principles of interpretation employed and the logical process used in arriving at the opinion.

3.2.4.8 The formal, expert opinion and its degree of probability.

3.2.4.9 Explanation of a qualified opinion and statement of additional materials or procedures required for greater certainty.

3.2.5 This is a text note on terminology in handwriting identification.

Some authors use the term "substantial agreement" in discussing what is required for an identification. I have used the term "sufficient agreement." The word "substantial" means nothing in that context if it does not mean "sufficient." And if it means "sufficient," there is no reason to use "substantial."

In and of itself "substantial" means having to do with a substance. "Substance" means either a kind of thing about which we can make predications or an individual being which exists in its own right. Thus humanity is the common substance, the nature of the species, which Peter and Paul share. But Peter is an individual substance, a being in his own right. How can two samples of handwriting be called substantially the same in either sense? Such confusing terminology is best not used.

3.3 HANDWRITING IDENTIFICATION.

3.3.1 The foundations of the discipline.

It is doubtful that many document examiners could give a physiological or psychological explanation of why handwriting identification works. The explanation is outside the scope of this treatise, but some of the reasons will be described briefly, to encourage deeper study of the matter. We must have no illusion. If we cannot explain this reasonably to reasonable minds, ours will be considered a futile discipline, and we will be subject to the greatest embarrassment if asked while testifying to validate the very foundations of our science.

Fortunately the pioneers in our field did such excellent work in this regard that we now enjoy the indulgent presumption of the law. That does not justify a seeming pervasive smugness and complacent neglect, for perceptive minds are raising challenges against the validity of our discipline. It is our duty to educate them; it is not their duty to reconstruct the extensive empirical researches which we ourselves have lost sight of.

3.3.1.1 Psychological and medical research has confirmed direct cause-effect relationship between brain organization and function on the one hand and the ability to write on the other. The work of Jeri Levy, for instance, indicates that brain organization determines the preferred writing hand as well as the posture of the writing hand.

3.3.1.2 Research in the fields of education, psychology, medicine, graphology and document examination all confirm that an individual's health condition, including intake of substances and the diet, may have gross to subtle effects on the writing ductus. The skeletal, neuro-muscular, cardiovascular, endocrine and other systems have been studied in that connection.

3.3.1.3 One and a half centuries of modern handwriting science and the personal experience of a vast number of professional observers since ancient times and in all cultures have empirically confirmed the individuality of handwriting.

3.3.1.4 The description of several hundred variables in handwriting, the observation of their relationships to or independence of each other, the ascertaining of the many ways in which they can show patterns of variation, and the many factors which can account for their remaining the same or changing -- all these combine to permit a virtually infinite number of distinct combinations of handwriting features.

Although we might not justifiably say that any particular observed combination of features has a precise numerical probability of occurrence, we can nevertheless demonstrate an astronomical number of possible individual handwritings.

3.3.1.5 Empirical research has shown that certain graphic features are outside the awareness of the writer, and that only one at a time can be central to the writer's attention for purposes of conscious modification. That research has also shown that there is an order of ease and difficulty as to which graphic features can be consciously altered.

A corollary to this is the demonstrated phenomenon that the deliberate alteration of any one graphic feature also necessitates certain other unintended alterations of related features. These and many other proven facts support the individuality of each person's handwriting and the possibility and method of identifying a questioned writing.

3.3.1.6 A mature handwriting style is an acquired habit pattern encapsulating many mental and physiological actions and characteristics. For instance, there are aesthetic appreciation influencing the choice of writing tool and paper, training of fine finger movements affecting the writing ability, school discipline in the penmanship class inculcating lifelong attitudes towards writing and communication, the configuration of the hand and fingers forbidding or requiring a certain type of pen grip.

One could go on at length listing other factors. All of these things are combined individually unique in each person, and as a result whatever they affect will partake of that person's individual uniqueness.

3.3.2 The act of writing.

It is assumed the reader has a mastery of the matter. What is given below is merely intended to summarize what is explained in great detail by the best authors.

3.3.2.1 Degree of mastery of the writing act, graphic maturity.

This has been mentioned already. A good examiner can estimate graphic maturity even from a writing that is deliberately disguised to look as if it were made by an unskilled writer.

3.3.2.2 The start and end of a single writing act give evidence of both the graphic maturity and whether or not the attention of the writer is focused on communicating or on the mechanics of the writing act.

3.3.2.3 A forgery, other than a simple or spurious forgery, requires attention to the mechanics of the writing act. That attention tends to break down as the writing act speeds up, is prolonged or is forming the more inconspicuous features. When attention to mechanics lessens, the writing act tends to slip back into habitual movements, in other words the person's authentic style.

3.3.2.4 Increasing speed, growing intensity of pressure, greater expansiveness and unstudied originality of forms tend to become more evident as the writing becomes more genuine and attention to mechanics lessens.

3.3.2.5 The school model inculcates a master pattern for forming the letters. A master pattern is the mental image the writer has concerning how any letter or combination of letters is to be executed. In a mature writer this mental image is so embedded in the subconscious that it is automatically executed at the proper time without need for deliberate attention or effort.

Although most writers in the field never discuss it, the school model also inculcates, either deliberately or indeliberately, master patterns for all eight categories of handwriting features. The individual writer creates or adopts new master patterns for all these features as the writing ability matures. Individually modified or developed master patterns are identifying notes.

3.3.2.6 The individual introduces certain variations into the graphic master patterns. These variations may occur in patterns as to the place or feature of the writing they affect, or they may occur in company with other variations. All variations introduce more mathematical possibilities for individualized handwritings that are even more serviceable for identification than the consistencies they vary from.

3.3.2.7 The document examiner must consider other factors in an examination. Some of these are the writing environment, posture of the writer, circumstances and conditions of the writing act, and purpose of the writing. The one factor of this kind which has the most direct effect on the writing is the manner of grip on the writing tool and the type of arm, hand or finger movement employed.

3.4 TERMINOLOGY FOR EXPRESSING DEGREES OF PROBABILITY.

The terminology given adopts that published in 36 JOURNAL OF FORENSIC SCIENCES, *The Standardization of Handwriting Opinion Terminology*, 311-319 (March 1991). It has been officially adopted by the Questioned Document Section of the American Academy of Forensic Sciences and by the American Board of Forensic Document Examiners. I believe all document examination organizations and all practitioners should adopt it also. The commentary given is my own. The reader is encouraged to obtain the article cited and to study the official explanation of, and brilliant rationale for, the terminology.

3.4.1 Identification (definite conclusion of identity).

This could be equated with the legal requirement for proof beyond a reasonable doubt. The examiner should be able to demonstrate comparability in the required number of exemplars, absence of any unexplainable significant differences, sufficient agreement in significant characteristics, and a scrupulous application of established procedures in making the examination.

3.4.2 Strong probability of identification (highly probable, very probable).

This could be equated with the legal requirement for proof by clear and convincing evidence. If the examiner has in any way not met the stringent requirements for a definite opinion or has had to qualify the opinion in any way, this would be the highest probability statement used.

3.4.3 Probable identification.

This could be equated with the legal requirement for proof by a preponderance of the evidence. If any major requirement set forth in the previous section as part of the identification process is incompletely satisfied, this would be the highest probability statement used.

3.4.4 Indications of identification (evidence to suggest).

This would be equated with a prima facie showing, whereby a party would have reasonable grounds for proceeding but has not yet met any burden of proof. From the criminalist's viewpoint, it would mean reasonable grounds for suspicion.

3.4.5 No conclusion concerning identification (totally inconclusive, indeterminable).

This would be equated with the legal rule whereby the legal presumptions would be operative and the party without the burden of proof would prevail.

3.4.6 Indications did not.

Comments under 3.4.4 apply.

3.4.7 Probably did not.

Comments under 3.4.3 apply.

3.4.8 Strong probability did not.

Comments under 3.4.2 apply.

3.4.9 Elimination (definitely did not).

Comments under 3.4.1 apply.

3.5 ON MAKING A QUALIFIED OPINION.

There is much discussion and disagreement in the literature about whether or not qualified opinions should be given and, if so, how they ought to be stated. I believe the entire discussion misses the real question as to what qualified opinions should be.

3.5.1 As the terminology given in 3.4 above indicates, only two statements permit a simply unqualified opinion. I believe every opinion which must be expressed as less than definite should be qualified by pertinent scientific explanations; and that covers most opinions, since only the opinionated are definite the great majority of times.

3.5.1.1 Anything that mitigates against any requirement for an identification or non-identification to any degree is cause for qualifying the opinion.

3.5.1.2 I believe that qualified opinions are not only scientifically justified but also legally acceptable. To justify legal acceptability, one need only point out that the law itself imposes various degrees of proof upon litigants, depending on the nature of the case. If an examiner refuses to give a qualified opinion, in a civil case the examiner is denying the litigant the legal right to the quality of proof needed to support the case.

3.5.1.3 A qualified opinion can be even more critical for a criminal defense. Let me submit for your consideration an extreme hypothetical case. Suppose the examiner determines that all the handwriting evidence available only supports a probable opinion that the defendant made the forged instrument. If the examiner, testifying for the defense, convinces the fact finder of that opinion, the defendant cannot be convicted, even though his own expert testifies that he made the forged instrument. Why? Because the fact finder is convinced the evidence does not support proof beyond a reasonable doubt! Only a definite expert handwriting opinion equates to proof beyond a reasonable doubt. But the expert must explain the cogent reasons why a definite identification cannot be supported.

3.5.1.4 A true expert states precisely why an opinion cannot be precise and precisely what is required for making it more precise. In this way there is scientific certitude regarding why the identification or non-identification is probable, and the attorney/client can have unqualified confidence in the qualified

opinion.

3.5.2 In light of the above points, the following elements should be required of a qualified expert opinion in order that it be considered expert.

3.5.2.1 A clear, precise statement of each element which requires that the opinion be stated as qualified.

3.5.2.2 The step or steps in the analytical process where the problem occurred.

3.5.2.3 The exact requirements for an identification which have not been met or have been met only partially.

3.5.2.4 Any applicable scientific principle which covers the missing or inadequately met requirements.

3.5.2.5 What further materials, tools, examinations or exemplars would be required to satisfy the problems set forth along with suggestions how they should be supplied.

3.5.2.6 The expert's expectations of what the new findings will be if the suggestions in 3.5.2.5 are complied with.

There is a dual motivation for doing this, other than having moral courage in one's considered opinion. If what we do is a science, we must take the scientific responsibility to make appropriate predictions.

The other motivation is eminently practical: It is a matter of fully earning the fees we have been paid. Since we are proposing that the attorney/client might consider expending more funds and time, as a managerial practicality we must offer a risk/benefit analysis. Indeed, I personally am inclined to believe that undertaking any examination and testing for a client, without having apprised the client of the range of risks and benefits involved, might border on the incompetent if not the unethical.

SECTION FOUR

DIFFERENT APPROACHES TO A HANDWRITING EXAMINATION

4. DIFFERENT APPROACHES TO A HANDWRITING EXAMINATION

In each approach suggested, the examiner covers the same territory. The difference is the logical organization and methodological procedure employed. One should adopt the approach that best fits one's own mental nature. As mentioned earlier, the approach not employed in the examination becomes a possible reliability testing process. Thus the examiner would want to become familiar with each approach so that, if a cross-examiner should ever test the opinion in that manner, the expert is still on familiar ground.

4.1 ELEMENTS OF THE EXPERT REPORT.

The first approach to an examination would be the order in which the elements of an expert statement were given in Sub-part 3.2.4. They are repeated here with the major questions the examiner should ask of self as the examination proceeds.

4.1.1 A statement of the problem investigated.

Have I clarified the precise problem posed? Does that entail knowledge, skill, equipment or time I do not have? Is the attorney/client willing to accept the truth whatever it might be, or am I being pressured to support a pre-established position? Have I been supplied with a sufficient and unskewed selection of exemplars? If not, how can I find others? Do I or will I have access to originals or the best extant copies when required?

4.1.2 Identification of each questioned and exemplar item examined.

Have I maintained the required record of the chain of custody of all documents given me? Have I retained, if appropriate, copies of all documents examined? Do I have an accurate description of each document examined? Have I marked my exhibits in the most logical order? For example, in signature examinations it is usually the questioned document first and the exemplars following in chronological order. Have I made my identifying mark on the documents which I examined?

For myself that last is a most difficult thing for me to bring myself to do. I am adverse to making any mark and thus an addition to any document. As a normal practice I make such a detailed description of the document and keep a copy for reference that I need never mark the original to prove I examined it on a given date. Do not take my practice as a norm in this matter. We all ought to overcome unreasonable personal inclinations and follow the well established procedures of our particular discipline, which procedures should be altered only for some commensurate reason.

4.1.3 Description of the procedure used, tests made and the scientific preference for their use in the type of examination made.

In so far as it is relevant to this study, I believe the item has received sufficient discussion already so that the reader can supply the necessary questions. Refer to

Part 2.1 for questions regarding the validity of the samples as authentic writings. Refer to Part 2.6 for questions regarding the influence of materials and tools on the writing. Refer to Sub-part 3.2.3 for what must be verified concerning controls. For technical tests and procedures, refer to the literature.

4.1.4 Pertinent characteristics of the questioned material.

Refer to the next paragraph, since the same questions apply.

4.1.5 Pertinent characteristics of the control materials.

Have I made all the physiological observations of the handwriting? Have I been careful not to permit the pictorial and more obvious to sway me from the more inconspicuous and difficult to observe and measure? Have I made the exact same observations in the exact same order of both the questioned and the control? Have I examined the former first and then examined the control completely independent of the questioned, without hunting for a preferred outcome? Have I accounted for variations and patterns of variations?

4.1.6 A comparison of the two sets of characteristics.

Have I carefully checked off all similarities and dissimilarities between the two sets? Which graphic features occurring together are necessarily, usually, or hardly ever convergent? Which graphic features do not occur though they would usually be expected to occur together with those that do?

4.1.7 The principles of interpretation employed and the logical process used in arriving at the opinion.

The principles can raise such questions as these: Have I determined the significant and insignificant similarities and dissimilarities? Have I accounted for alternative reasonable explanations for my observations? Might I be facing some special problem, such as a health factor or narcotics? Have I determined class versus individual characteristics?

4.1.8 The formal, expert opinion and its degree of probability.

Refer to the discussion in Part 3.4.

4.1.9 Explanation of a qualified opinion and statement of additional materials or procedures required for greater certainty.

Refer to the discussion in Part 3.5.

4.1.10 The examiner applies the proper reliability checks to each step of the process.

Refer to Sections 5 and 6.

4.1.11 The findings and conclusion are ready for report to the attorney/client in the appropriate form.

4.2 THE OPINION AND ITS REASONS AND REASONING.

This second approach is a quite simplified version of the first. Much of what is explicitly spelled out in the first is either implied or left to the disciplined habit of the experienced examiner. Beginners should be required to follow the most detailed and stringent procedure.

The experienced examiner naturally develops a personal style and streamlined approach. But even the most skilled examiner, when perplexed, must have the honesty and humility to admit to the difficulty and reapproach the problem as the neophyte must. The whole matter could also be submitted to a respected colleague for independent advice.

This second approach is based on Albert S. Osborn's dictum that an expert opinion is expert only if it gives the "reasons and reasoning" for the opinion. Lacking that, it is merely an opinion and should not be admitted.

4.2.1 What are the pertinent data observed about the document? These are the factual reasons for the opinion.

These must always be observable facts which the expert should demonstrate so that the fact-finder can easily see for self. For handwriting identification to be reliable, the observations must be characteristic of the writer's style and not merely a single feature or singular occurrence. Additionally, that characteristic must be uniquely individual or be uniquely combined with several characteristics.

4.2.2 What are the applicable scientific principles of interpretation? These are the theoretical reasons for the opinion.

The expert should be able to explain in plain English, so that the fact-finder can easily understand, why the principles are valid and why they are applicable in this case. There must not be an anomaly or contradiction in applying the principles. For example, if I say that such-and-such is the reason why the questioned signature is false, would an admitted authentic signature logically have to be considered false because such-and-such also applies to it?

4.2.3 What was the reasoning process in applying those principles to those facts?

The logical steps leading from the facts to the expert opinion should be such as any intelligent adult can appreciate, if it is clearly explained. The expert witness should be skilled in communication by common English rather than jargon.

4.2.4 What conclusion was arrived at?

This is the expert opinion on the fact at issue: The alleged author either did or did not make the document; if not, the one who did can or cannot be identified; if so, this person did it.

4.3 THE PHYSIOLOGY OF THE DOCUMENT.

The third approach considers the writing more directly as a part of a whole, one element of the entire questioned document. This is a particularly good approach for those who are more practical minded, who like to emphasize the concrete, sense-experienced realities. The first approach was more functionally oriented and the second more theoretical.

4.3.1 Pertinent features of the paper itself.

Refer to Sub-part 2.6.1 for some suggested questions to consider.

4.3.2 Pertinent features of the pre-printed or standard form.

One should ascertain the facts about the manufacturer and date of manufacture of standard forms in order to determine whether the purported date and source of the questioned writing is in conflict with those facts. There are innumerable kinds of forms raising questions which might require a special analytic skill. For example: Were logged entries made sequentially or separately? How might the format have affected the characteristics of the questioned writing? Are the exemplar writings comparable to writing on such standard forms?

4.3.3 The writing tool and medium: Ink, pencil, etc.

Refer to Sub-parts 2.6.2 and 2.6.3 for suggested questions.

4.3.4 Nature of the writing itself.

Refer to Part 2.1 for questions concerning the type of false writing one might be examining. Refer to Sub-part 2.3.4 for questions concerning the level of writing skill. Refer to Sub-part 3.3.2 for various aspects of the writing act to be considered. Most of all one would go through the eight categories of handwriting characteristics in order to make a thorough and accurate observation of all potentially identifying notes.

4.3.5 The assembly of the finished document, if applicable.

Refer to the remarks in Sub-part 2.6.4.

4.3.6 Environmental effects since the making of the document, especially if destructive of evidence.

Much of this requires technical tests and thus belongs to another discussion. For our present purposes, we want to be certain that we do not take as part of the original handwriting something which has a source other than the writer and that no writing has been damaged or obliterated, whether intentionally or unintentionally. If we consider such a thing to be a graphic trait of the writer, our opinion could be impeachable even if the mistake were incidental to the central question.

There is also the importance of protecting documents in our keeping from all possible harm. The literature has many good treatises on the proper handling and storage of documents. But if such an untoward event has occurred under our custody, have we promptly brought it to the attention of the interested parties? Have we accounted for how the event came about and taken remedial steps for the future? What effect does the damage to the document have on its evidential value and on the opinion which we have based on the undamaged document? Can any obliteration be reconstructed? Do we have the requisite insurance or a good defense in case legal action is taken against us?

4.3.7 The larger context to which the document belongs; such as one check from a book of checks, letters in a series, W-2 Forms, a page from a log or diary, and so on.

This partly overlaps 4.3.2 above. Are other documents in the same series available as exemplars, or do they have suspicious features also? Have the previous and following members been together and maybe left on each other indented writing during execution or "ghost" writing during storage? Does our questioned document show anomalies when compared to others in the series?

4.3.8 Tests made on the document and their effects, particularly if destructive.

Since we are focusing on handwriting identification, destructive testing is definitely not appropriate. Similarly most non-destructive testing also is specifically inapplicable in a handwriting identification. The great majority of handwriting identification problems require only a good pair of eyes, some basic and not too esoteric magnifiers, a modicum of intelligence and enough prudence to check the major references when required.

4.3.9 Demonstrations prepared for Court use.

Are all demonstrative exhibits derived from admissible exemplars? Are the reproductions accurate and reliable for what they are meant to demonstrate? Are they in any way prejudicial, such as a composite of parts from the questioned document made to read as if it were a confession by the suspect? Would an individual feature isolated as an element of the proof still be compelling if seen in the original context from which it was taken?

4.3.10 Formal opinion of the document examiner.

This is the statement of identification or non-identification with the appropriate degree of probability. Refer to Part 3.4.

4.3.11 Reasons for the opinion.

This would combine the things discussed in Sub-parts 4.2.2, 4.2.3 and 4.2.4.

4.4 FINAL COMMENTS.

I am sure there are many other approaches one could find in the document examination literature or develop for oneself. Eventually each examiner would want to develop a personal methodology that fits with one's way of thinking, special talents, type of clientele and theoretical outlook. However, whatever the method adopted or developed, it must comprise all the elements which have been discussed in the three procedures given. At the very least, if some element is not included explicitly, allowance must be made so as to account for it when called for as well as to incorporate any observation, procedure or test as it is learned of or required by the situation.

SECTION FIVE

EACH APPROACH USED
AS A RELIABILITY TEST

5. EACH APPROACH USED AS A RELIABILITY TEST

Recall that in the three approaches to the handwriting examination given in Section 4 above, the same ground is covered, but in a different order and with a different logic. Detailed discussions need not be repeated here, so I will only suggest how an alternative approach can be adapted for its new use. Essentially what we do is re-examine but in a different manner and in a more simplified procedure.

If a re-examination is to be done by a different expert, the same procedure would be the best one to employ. The proviso is that the re-examiner not know the identity of the first examiner nor the results obtained previously. It should be a completely blind test done with the understanding it is a first-time examination. Avoiding coworker re-examination precludes the understandable human inclination to respect our coworkers' professional competence and personal feelings as well as the inevitable suggestion that confirmation of accuracy is simply a case of mutual back-scratching.

However, what we are focusing on in this discussion is how the individual expert can justify one's own procedure and results. It is a necessary scientific virtue to be ruthlessly objective about one's own talent and work product. It is a forensic necessity to preempt the most devastating challenge an opposing attorney might bring against one's expert handwriting testimony. It is a personal proverb of mine that the only safeguard against humiliation is humility. Likewise, assuming no bias on the part of the bench, the only safeguard against impeachment is to be professionally competent and scrupulously truthful. Employing self-checks endows us with both safeguards.

5.1 BASED ON THE ELEMENTS OF THE EXPERT STATEMENT.

5.1.1 Statement of the problem investigated.

The initial report to the attorney/client is made as a verbal, tentative opinion. Have I indeed addressed the correct question? Has there been any change in the case necessitating a reapproachment to the problem? Have I uncovered an unsuspected problem that might need closer examination?

5.1.2 Identification of each questioned and exemplar item examined.

Can items needed for greater certainty in the matter be produced? Did the exemplars submitted turn out to be problematic in any way? Do I have good quality copies, neither distorting nor masking traits? Have I seen the originals?

5.1.3 Description of the procedure and tests employed.

Have I discovered a better alternative than the one I employed? Has the one I employed simply failed to produce the data needed? Is there an alternative test which might produce comparable results? Do the results of the test employed require that some other test produce specific results, and has that test produced those expected results?

5.1.4 Pertinent characteristics of the questioned and control material and their comparison.

This is the great drudgery of reliability testing. One must go through the hardest and most exacting part of the work all over again. It is best to set the entire problem aside and come back to it in a fresh frame of mind. One should make use of the maximum time allowed before the report is due. That is not to be taken as a suggestion to make an unethical padding of time charged, but to permit the maximum application of one's objectivity and talent.

I prefer to have at least a week in which to make my examination. First the documents are given a preliminary scrutiny to establish the parameters of the examination and anticipate problems that might arise. Then I review the material off and on for a few minutes over a day or two. The eye becomes familiar with the material and the mind tuned to the problem to be addressed. Next, a thorough

systematic examination is made from beginning to end. The entire file is set aside for at least a day and the re-examination made after that. Although such luxury of time is rare, that process increases competence in other cases, even with the most pressing of time constraints.

5.1.5 The principles of interpretation employed and the logical process used in arriving at the opinion.

Refer to Sub-parts 3.3.2, 4.1.7 and 4.2.2 for evaluating principles of interpretation. Refer to Parts 6.1, 6.3 and 6.7 for evaluating logical processes.

5.1.6 The formal, expert opinion and its degree of probability.

Refer to Part 3.4.

5.1.7 Statements regarding a qualified opinion.

Refer to Part 3.5.

5.2 THE OPINION, ITS REASONS AND REASONING.

As mentioned in Part 4.2, the second approach was based on Albert S. Osborn's dictum that only a statement of the reasons and reasoning underlying an opinion can make it an expert opinion. He was thinking in the context of testimony at trial; thus we think as an opposing cross-examiner putting ourselves and our opinion under fire.

Skilled trial attorneys can teach us much about competence. I always find they cross-examine me when employing my services. They are searching for weak points in their case; and, since my opinion is part of their case, they do not tolerate weak points. They search out facts with the enthusiasm of pre-schoolers on an Easter egg hunt. They distinguish persons and personalities on the one hand from positions and postures on the other. It is the minority, the incompetent or unprincipled or ill mannered, who make personal attacks.

What all of this leads to is the value to the expert of thinking like a trial lawyer. Already thinking like a scientist assures competence in one's discipline. Learning to think like a trial lawyer makes for competence in one's testimony. Legal journals discuss whether or not lawyers and judges should learn the ways of science. My thinking is that they should rather require forensic scientists to learn the ways of the law and to translate science from its own language into the language of those whom scientists are given the privilege to serve.

In view of all this, in any self-test of reliability we ask ourselves the kinds of questions skilled cross-examiners would ask us. Combat troops are best trained for combat by being put under fire. Expert witnesses best prepare for giving testimony by pre-grilling themselves and each other.

5.2.1 What are the pertinent facts observed about the document?

Did you make any other observations to which you have not yet testified? What are they? Why have you held them back? (Cross-examiners do not just like to ask questions; they like to ask questions that imply an impeachment no matter what the answer.) Are not the following also possible observations to be made of a handwriting? Then why did you not make them?

Why did you choose only those few facts to illustrate with demonstrative exhibits? Would not this or that fact show the exact opposite if you had enlarged it? Isn't it a

fact that you used only those few exemplars (even if you had a million exemplars) because your client supplied them?

During cross-examination insist that as an expert witness you have the right to evaluate the validity of the question itself. Also, in keeping with Osborn's dictum, you should not be required to give a strict yes or no answer, but you should be permitted to give the rationale for each answer. That does not mean the judge will allow you to, but at least put your position on the record.

5.2.2 What are the applicable scientific principles?

Be prepared for the very scientific foundations of handwriting identification to be challenged. If you are one of those experts who do not think this is a scientific endeavor, then I for one shall not argue with you: What you do is most assuredly not scientific. In which case I cannot think of anything that would justify any court permitting you to testify in the first place.

For the others of us, refer to Sub-part 3.3.1 for a summarization of the foundations of the discipline and then study the standard authors.

5.2.3 What was the reasoning process in applying those principles to those facts?

In Section 6 several logical processes are discussed as reliability checks. Refer to them, employing a different logic than the one you did in the initial examination.

5.2.4 What conclusion was arrived at?

Did you not express the opinion you were paid to have? Isn't it a fact that you are not really sure about your opinion, which is why you did not say "definite"? Isn't it a fact that handwriting identification is problematic, and so you overstated it when you said "definite"? (Cross-examiners are the only segment of society that enjoys the legally established privilege of having it both ways.)

5.3 THE PHYSIOLOGY OF THE DOCUMENT.

The third approach considered the writing directly as a part of the whole document. Actually this is the approach attorneys would appreciate most, since it is concrete. It deals primarily with observable, demonstrable facts; it is the most empirical. No doubt I should have placed it first for that very reason. Having placed it last, you can infer what my primary mental cast is: Theoretical and logical!

There is no need to detail the questions for reliability testing, because these parts of the process have already been spelled out at length in this study.

SECTION SIX

FURTHER RELIABILITY TESTS

6. FURTHER RELIABILITY TESTS

In each of these reliability tests you are becoming a split personality. You are assuming the role of your own opponent, of a relentless cross-examiner bent on irreparably impeaching you. Like Pogo Possum said, "We have met the enemy and he is us." When we do meet the opponent who is not us, we have been in his shoes and have seen the issue from his viewpoint. It is not too likely that he and his consultant could rake us over the coals more thoroughly than we have raked ourselves.

6.1 REDUCTIO AD ABSURDUM TEST.

Reductio ad absurdum is Latin for reducing an opponent's faulty argument to its necessarily absurd conclusion. This allows a simple two-fold test for evaluating the reasons given for a handwriting expert opinion. Let us suppose the expert says that the questioned signature is authentic because of the way capital "R" and loop of small "y" in "Ruby" are formed.

6.1.1 First: Is there any unquestioned, authentic signature lacking one or both of those features? If so, the expert must logically say that, while the questioned signature is authentic, the authentic one is false.

6.1.2 Second: Are there definitely false signatures which have those features? If so, the expert must logically say the false is authentic.

6.1.3 To escape the absurdity, the expert must talk of other identifying features to justify the opinion. That implicitly admits to an incomplete or incompetent opinion at first. You can then go on to apply the dual test to the new rationale.

6.2 DEVIL'S ADVOCATE METHOD.

Once again you are going to become your own adversary in this method.

6.2.1 The first step is to assume that the conclusion you reached is diametrically opposite to the truth of the matter. If you said the alleged writer definitely did make the signature, assume the truth of the matter is that the alleged writer definitely did not make the signature. If you concluded the documents submitted for examination do not allow for any opinion at all, first assume that there is a definite identity and run the method through. You next make the contrary assumption of a definite non-identify and run the method through again.

6.2.2 Ask yourself: What observations support the assumed truth of the matter, but which I completely missed? What observations did I make in support of the assumed incorrect opinion that are not physically as I thought they were? What principles of analysis, evaluation and interpretation have I overlooked? How did I misinterpret the ones I used? What assumptions account for my having missed these observations and interpretations?

6.2.3 Having formulated the new opinion, what reasonable explanations are there for the significant, identifying notes relied upon in the original opinion?

6.2.4 How can I reasonably explain the indications which are contrary to the new opinion?

6.2.5 Lastly, returning to my original opinion, am I now able to demonstrate why everything that flowed from the assumption made in 6.2.1 is false? If I am not fully able to, what step of the analytical process do I have to correct or expand in order to be able to do so?

The less certain and the more qualified the original opinion was, the more things you should have had to address through this reliability test.

6.3 EITHER/OR REASONING.

Just as a bull has two horns so that he can gore his enemy going in either direction, so a good either/or question will catch a faulty logic whichever answer is chosen. The difference between just any either/or argument and the dilemma is this. An ordinary either/or argument will prove the opponent wrong in one of two different ways. The two parts of the dilemma will prove the opponent wrong in the very same way. This discussion considers the either/or syllogism in general.

The questioner sets before the one being examined two choices, only one of which may be taken. Unknown to the one replying, each is fraught with a trap, or better a horn upon which to impale the opponent's position. In our usage here, each half of our either/or argument will prove the document is true when the opponent says it is false; it will prove it is false when the opponent says it is true. Of course, if the opponent is right, we can be caught in our own trap and proven wrong. And that brings us to the first rule for using an either/or argument.

6.3.1 The first rule is that we are asking the opponent about an opinion that is definitely flawed. Only in that way can we win and he lose no matter whichever of two sole choices he takes. In any other situation he has at least a fifty-fifty chance of winning; and, if he is right and is sharp, he has a 100% certitude of bettering us. So if you create an either/or question for yourself which you cannot answer, you have located a mistake or weak point in your analysis. If you can satisfactorily answer both choices, you help prove your opinion correct.

6.3.2 The second rule is that the two choices form a complete disjunction, that there be no other logical choices than the two given. The old hack about have you stopped beating your wife is a good example of an illogical disjunction. It asks you to make a choice between either you stopped beating her or you did not. There are alternative logical choices: "I have never beaten my wife," "I never had a wife," and others.

The only complete disjunction is between the affirmation and negation of the very same simple proposition. "The capital R is either block printed or cursive. Which do you say it is?" There are other styles possible, so the twofold choice is an invalid either/or question. Rather we should begin by saying: "The capital R is either a block printed capital or it is not."

"Is the capital R of the questioned writing a block printed capital R similar in style to the one used in the exemplar writing or not?" This is not a simple, but a compound question. "Is the capital R of the questioned writing a block printed capital or not?" That is the first simple part of the complex question. The second is: "Is the capital R of the exemplar writing a block printed capital or not?" The third is: "Now, is the capital R of the questioned writing similar in style to the capital R of the exemplar or not?" Now we can spring our trap, catching the opponent in the correct one of the our two arguments.

6.3.3 The third rule is that one and only one of the two choices must be true, and that means that the other must be false. If (a) both could be true, or if (b) both could be false, or if (c) either could be false and the other true, there cannot be an ironclad trap. Nor could there be a necessary conclusion, whatever the opponent might answer.

An example. We begin our argument thus: "The capital R is either in Palmer or Spencerian style." It makes no difference how we develop it from there; it is built on logical sands, for both possibilities could be false. Suppose we say: "The capital R is either Palmer style or of large style." Either choice may be true or false while the other may also be true or false. The argument will not be logically compelling.

6.3.4 The fourth rule is that we now take whichever answer was given and make an argument which logically either disproves the opponent's position or supports ours. To disprove the opponent's position we use a *reductio ad absurdum*. To support our own we ask the opponent to admit to the correct answer and then draw the logical inference. Of course, we must be certain that we have prepared an airtight argument. And that brings us to the final rule.

6.3.5 At no point along the way must there be an escape for the opponent, at least not a logical escape. If he runs for cover or denies the logic of the either/or argument, we must be able to show to the fact finder that he is either denying an observable fact or violating a principle he agreed to earlier. Establishing at an earlier time which authors and texts he considers to be authoritative or which procedures and principles he himself employs will assure us a wall of authority barring all routes of escape for him.

6.4 MAKING UNSTATED ASSUMPTIONS AND INFERENCES EXPLICIT.

6.4.1 We go over the opinion searching for unstated assumptions and inferences and listing each and where it occurs.

6.4.2 For an example of unstated inference, if the expert submits a curriculum vitae listing ESDA (electrostatic detection apparatus) among "equipment used" in support of an examination of a photocopied signature, there is an inference that ESDA is used in every examination made. That would be a silly thing to assert, yet the expert infers that by not employing the correct expression of "equipment available."

6.4.3 An example of an unstated assumption is the case of the Hitler Diaries. The first experts were asked whether or not the exemplars were written by the same person who wrote the diaries. They said yes, and they were right. But they were wrong because of the assumption that the exemplars supplied were authentic writings by Hitler. The exemplars had been made by the same person who made the diaries -- the forger! A worse assumption in that particular case would be to assume that the many experts who claim to have solved the mystery of the Hitler Diaries all really deserve the credit.

6.4.4 Having identified the unstated assumption or inference, we ask the opponent to acknowledge it. If he refuses, his objectivity and candidness are self-impeached. If he does acknowledge it, we proceed.

6.4.5 We now embark upon an argument *reductio ad absurdum* or argue by means of an either/or syllogism. Refer to Parts 6.1 and 6.3.

6.5 INVESTIGATING AN ALTERNATE SUSPECT.

Refer to Sub-part 3.2.2.6 for a simple statement of the method. Refer to Part 7.5 for an illustration of how it works.

6.6 CONSIDERING THE QUESTIONED DOCUMENT AS ANOTHER TYPE OF FORGERY.

6.6.1 We begin by determining the types of forgery, as listed under the various classifications in Section 1, according to which we investigated the questioned document.

6.6.2 We next list the classifications we did not consider in determining the type of forgery the questioned document might be.

6.6.3 We proceed to investigate the questioned document according to the indications for each possible type of forgery not yet considered.

6.6.4 The results of this new examination should be consonant with, or at least not contradictory of, the results originally obtained.

6.6.5 Conflicting results are the key to mistakes and weaknesses in our expert opinion.

6.7 THE CONDITIONAL SYLLOGISM.

If we have not entirely worn ourselves down as either the cross-examiner or the testifying expert, we can try one more reliability test. This utilizes conditional syllogistic reasoning. I am not thinking merely of the hypothetical question employed by attorneys in cross-examination. That certainly is included, but the scope to be considered here is broader.

6.7.1 The parts of the conditional syllogism are:

1. The "if" statement, the conditional fact or theory;
2. The "then" statement, saying what would probably follow upon that condition being true;
3. The "but" statement, the assertion that the "if" statement is indeed true; and
4. The "therefore" statement, the formal conclusion asserting that the "then" statement is true as a consequence of the "but" statement being true.

6.7.2 If challenged, the person offering the conditional syllogism must prove the following three things to demonstrate that the argument is cogent:

1. That the "if" statement is true, or at least as plausible as the contrary assertion by the opponent;
2. That there is a causal or other necessary connection between the "if" and the "then" statements; and
3. That there is no violation of the rules of formal logic anywhere in the conditional syllogism.

6.7.3 Often the "therefore" statement substitutes consequences of the "but" statement for the "but" statement itself. Each consequent of the "if" statement should be proven successively in a series of conditional syllogisms. We should not permit an opponent to skip any necessary step in proving his position. A very

fanciful conditional syllogism demonstrating the substitution of supposed consequences for the logical conclusion is this:

"What if the moon were truly made of green cheese. Then cows could fly and horses sing. But the moon is made of green cheese, so we can fly Bossie to New York and hear Old Dobbin sing at the Met." The formal rules all seem to be adhered to, but one would have a difficult time proving either that the moon is made of green cheese or that there is a connection between the composition of the moon and any extraordinary capacities of cows and horses. Additionally, even if cows can fly and horses sing, it must still be proven that this cow and horse can and will do so in New York.

6.7.4 There are two main kinds of conditional syllogisms. We can call one the "what if in addition" argument and the other the "what if instead" argument. In the first kind, the opponent adds a new element to the situation as we described it. In the second kind, the opponent either replaces one of the elements of the problem as we stated it with a different one or alters an element so that it will make a difference in the nature of the problem.

6.7.4.1 First let us consider how the opponent could add a new element to the situation as we described it. Suppose we have argued this way: "The signature is false because the lines waver, stop and have breaks and patches in them. This is so since research proves these things occur in most forgeries, and observation shows they do not occur in this person's authentic signatures." The opponent counters: "What if in addition the person were drunk, experienced difficulty in writing and tried hard to make it look better. Then would that not cause the lines to waver, stop and have breaks and patches?" Naturally, anyone familiar with the applicable literature will have to say yes. The opponent completes the conditional syllogism by asserting that the condition was indeed true: "But the writer was drunk, so therefore as you just testified the line quality shows a genuine signature, doesn't it?" Notice that in this example we had already agreed to the theoretical basis of the opponent's argument, so he merely had to supply the factual basis.

6.7.4.2 In the second kind of conditional syllogism, the opponent might counter our same arguments by changing the observations and reasons for our conclusion.

Thus he might say: "If instead of stops in the lines the pen really caught on snags in the desk top, then would not that be no proof that the signatures were false?" We agree, and the opponent then proceeds to attempt a proof that his "if instead" assertion is actually a fact. Similar arguments would take each of our indications of falsity in turn and show they also are not proof of falsity. Notice that in this particular example the opponent is using the very same theoretical basis we had used in our opinion. The "what if instead" could be an alternative theoretical hypothesis as well as an alternative factual hypothesis.

6.7.5 The major problem encountered in syllogistic reasoning, and which accounts for so many sad results, is that no distinction is made between formal and material logic. Material logic has to do with the truth or falsity of the content of statements. Formal logic has to do with the manner in which the statements are used in the logical reasoning process. In the first four reliability tests we concentrated almost entirely upon material logic, testing the truth or falsity of statements. If we have conceded the truth of the opponent's statements, we can prevail in the argument only if his logical processes are faulty.

I cannot give a complete discussion of conditional reasoning in this paper. So I have only indicated some of the more general rules. As we have done previously, if while acting as our own opponent we uncover a weak point in our argument, we proceed with either the *reductio ad absurdum* or either/or reasoning to demonstrate unreliability.

6.7.6 Even the most complex arguments can be logically reduced to a series of separate syllogisms. Inductive syllogisms permit us to draw inferences from our premises which are observed facts; deductive syllogisms give conclusions that flow necessarily from our premises which are theoretical principles. If we obtain a false or even merely probably true conclusion from a deductive syllogism, we must have a flaw in our formal logic or an error in our premises. Inductive syllogisms, on the other hand, offer conclusions of various degrees of probability.

6.7.7 In scientific inquiry, the conditional syllogisms we will use are inductive; that is, they proceed from physical observations of the samples studied and make general statements. Theoretically at least, they always remain open to revision, subject to better and more observations of the same, better, or more samples.

6.7.7.1 Ideally in expressing forensic expert opinions or in testing such opinions

the conditional syllogisms used proceed from factual observations to factual conclusions. A theoretical principle, which was previously established through empirical scientific experiment, is used to establish the necessary connection between factual premises and factual conclusions. That connection may be expressed or implied. For the best of results both factual and theoretical bases of all arguments should be expressed and evaluated.

6.7.7.2 As mentioned already, the completed conditional syllogism has four statements: The conditional "if" statement, the "then" statement giving what follows if the condition is accepted, a "but" statement that says the condition is indeed true, and the "therefore" statement asserting that the conclusion is proved. The "if" and "then" statements comprise the hypothetical questions used in cross-examination. They can be expressed as: "What if" this one thing were true, "then wouldn't" this other thing also be true?

6.7.7.3 Most often the "but" and "therefore" statements are left out, only to be supplied once the opponent accepts the conditional connection. In any case, with acceptance of the hypothetical, the assertion that the condition is a fact is made and the opponent declared obligated to agree with the conditional argument. Thus the opponent is declared to have proven the proponent's assertion. In court, they are best supplied only well after the witness who accepted the hypothetical under cross-examination has departed and can no longer counter a flawed application of the hypothesis.

6.7.7.4 Conditional syllogisms are used so often to entrap us into agreeing with disagreeable conclusions that we usually immediately start denying any "what if" or "but if" statements people make to us. In fact, contrary to the intended order of logical reasoning, we sometimes wait till we see the conclusion which the conditional reasoning is meant to reach before we consider agreeing with it. We forget that, since conditional syllogisms are inductive and not necessarily cogent deductive reasoning, they are never necessarily logically compelling but rather rhetorically compelling. But then proof in court should be both rhetorically and legally compelling. Ideally it is logically and scientifically correct as well as rhetorically persuasive.

6.7.8 In testing the reliability of our opinion and acting as a cross-examiner, we want to establish the condition contrary to that argument which we used as experts and to prove the conclusion contrary to that which we originally reached. In other words, the conditional syllogism aims to turn the opponent's position on its head, inside out, front to back and side to side. It also takes for granted much background information and principles used for interpreting data. To reply to the adverse conditional syllogisms, we have to be able to unravel all of that and assess it.

6.7.8.1 The first statement of the syllogism is the conditional premise and may be the general principle whose truth is the scientific theory relied upon. It is accepted as proven by empirical observation in the particular science (such as speed reduces deliberate falsification in handwriting), has been demonstrated as a self-evident proposition (such as a whole is greater than any one of its parts), was derived from another science (such as what numerical occurrence together of two events is statistically significant), or agreed upon by the parties to the argument (in legal action these are such things as the rules of evidence and stipulations).

If the conditional premise does not enjoy one of those four agreements, the person relying on it must prove its truthfulness. In many cases it will be an unstated assumption or conclusion of an implied syllogism that we must ferret out and confront the opponent with.

The major premise may also be a statement about the physically observable and measurable data. The opponent sets a condition that states that our observations are incorrect or incomplete. If he thinks we were incorrect, he will argue "what if instead." If he thinks we were incomplete, he will argue "what if also."

6.7.8.2 The conditional statement must be accurate, or at least as plausible as the opposing statement it contradicts. If an observable fact which the conditional statement alleges is not physically verified, its validity as a premise is destroyed and the conclusion based on it is groundless. If a principle which the conditional statement asserts is not valid, again the conclusion cannot be validated. So we do not simply answer yes or no to a conditional argument nor do we reply off hand. We assess the accuracy of the premise and the logical nexus it has to the conclusion. It is imperative to do these two things before ever agreeing or disagreeing.

6.7.8.3 A factual premise is proven by verifiable observation, the observation which is the subject of demonstrative exhibits. The premise may also be established by previous agreement of the parties, or by stipulation, or by a fact relied upon by the opponent. It may be a universal proposition ("If every questioned signature has a block capital R") or a particular proposition ("If some of the questioned signatures have block capital R's"). It may be positive or negative ("If the capital R is block print," or, "If the capital R is not block print").

6.7.8.4 Since, as indicated earlier, the "but" premise is usually left for later, the second of the two statements of the conditional syllogism is most often the proposed conclusion, the thing that must be proven, what the proponent wants the opponent to accept as true. In that case the third premise, the "but" statement, is implied. That third implied statement connects the premise and conclusion. Conditional syllogisms are traps because we fail to consider that implied statement, make it explicit, or force the opponent to make it explicit. And our implied third statement might well be different than the opponent's. That is why people often think they have agreed and discover later they are at worse loggerheads than ever, accusing each other of reneging on an understanding.

An example: "If all of the authentic signatures have capital R's block printed, the questioned signature is authentic." The two implied "but" premises are: "The questioned signature has a capital R block printed," a factual statement, and, "Agreement of capitals proves authenticity," a theoretical statement.

Another example: "If all of the authentic signatures have capital R's block printed, the questioned signature is not authentic." The two implied "but" premises are the contrary of before. As you can easily see, we cannot avoid using conditional syllogisms of some kind. Unfortunately we can avoid using them explicitly and logically.

6.7.9 No conclusion can logically follow from two negative statements.

For example, the following is illogical. Assume it has been proven that the questioned signature does not have a block capital R. Then this argument is offered: "If none of the authentic signatures has a block capital R, the questioned signature is authentic."

The conclusion may well be true, but its truth has a purely accidental relationship to our argument. In fact, if it were true and we offered that argument, the opponent would impeach our faulty logic and so might well convince the fact finder to decide against the unproven truth. The conclusion may equally well be false. Suppose the exemplar has a Spencerian capital R and the questioned has a German Gothic capital R. Both premises are indeed true, while the conclusion is probably false.

6.7.10 Do not argue back from the "then" statement to the "if" statement. In other words, even though the conclusion necessarily follows from the condition being true, the fact that the conclusion is true does not prove that the condition is true.

6.7.10.1 For example, we may be correct to argue: "If all exemplars and the questioned signature have the same style of capital R, then the questioned signature is genuine. But they do, therefore the questioned signature is genuine." We would definitely be incorrect to argue: "If all the exemplars and the questioned signature have the same style of capital R, the questioned signature is genuine. But the questioned signature is genuine, therefore they all have the same style capital R."

If that were logically compelling, the writer could change his style of capital R and prove someone else had written the very same signature which he just finished writing.

6.7.10.2 That brings us to another point. In a string of conditional syllogisms, a later conclusion in the string cannot be used to prove an earlier premise in the string. That would be arguing in a circle. If it were logically cogent, anyone could prove absolutely any statement, no matter how ridiculous. An example of a circular argument is this. The "then," "but," and "therefore" form is reduced to simple "if" sentences in order to conserve space and time.

"If the rich get richer, they'll create jobs. If they create jobs, the poor can work.

If the poor can work, they'll need less help. If they need less help, we'll save tax money. If we save tax money, we can cut taxes. If we cut taxes, the rich will get richer. If the rich get richer, they'll create jobs." We must bring in outside evidence to prove the truthfulness of a key premise and the necessary connection to its immediate consequence.

6.7.11 Acting as our own opponent, we isolate every conditional syllogism employed, state it in its essential and simple form, unravel multiple syllogisms into their component syllogisms, make explicit the implied premises, and then test each against the principles of formal logic. We also evaluate the truthfulness of each theoretical statement and the accuracy of each factual statement.

6.7.12 As before, any faulty logic will permit an argument *reductio ad absurdum* or an argument by means of either/or reasoning. These two are the finest reliability tests, because they are rigidly logical, easy to follow when done correctly, and have an element of mental play which delights the human mind. Thus they can combine sound logic, factual statements, general principles and ease of demonstration with an appeal to the finer human emotions such as delight and humor. Just the ticket for a good forensic argument.

6.8 FINAL COMMENTS.

Having put ourselves at the receiving end of all these attacks, we have prudent hopes of having preempted all attacks against us by the cross-examiner. We have corrected our mistakes, honed our logic, mastered our principles, and polished our presentation. We have vindicated our opinion against every reasonable challenge.

SECTION SEVEN

ILLUSTRATIVE CASES

7. ILLUSTRATIVE CASES.

The cases chosen as illustrations had to have one feature in common: They were such as to admit of necessity some degree of ambiguity. If a case is such that the answer is blatantly obvious, no reliability testing is needed. For example, you see little George Washington standing in the midst of wood chips, over a fallen cherry tree with an ax in hand and sweat pouring off his forehead. What else might a perpetrator, caught with the ax still finishing the final smack (analogously with the ink still wet on his fingers), say but that he cannot tell a lie, particularly since there is no hope of getting away with it. In the cases discussed here, we may not even know the tree had been cut down, much less who did it.

The first case was shared by a good friend. For our purposes, we have no knowledge of the many exemplars she had available nor of all the information that came from other than the examination of the signatures. As in all these illustrative cases, the hypothetical situation is that no other documents nor evidence is at hand except what is given herein. Part of our opinion may well have to be an estimate of the type of material which is required by us in order to come to some kind of defensible opinion.

All illustrations, except for those in "The case of the loving heiress," are from actual cases. They are contained in the public record, so no confidentiality is violated nor privacy trespassed.

7.1 THE CASE OF A WITNESS CALLED WINE: DEVIL'S ADVOCATE APPROACH TO RELIABILITY TESTING.

7.1.1 The samples to be examined.

On the following page, the signatures marked 1 and 2 are authentic exemplars of Ms. Wine's signatures. We take it as a stipulated fact that they were written about two years prior to the questioned signature, which is indicated as B.

Ms. Wine allegedly subscribed Signature B to a will as witness, but Ms. Wine is now deceased and the will is contested by our client. The samples are enlarged about 150% for ease of observation and marking of reference points. With Signatures 1 and 2 there appear encircled letters which are reference points for observations we offer to support our opinion that Signature B is false. With Signature B there appear encircled numerals which are reference points for observations made by us during our reliability check. We anticipate that the opposing expert and the cross-examiner will offer those points against us, so we must anticipate the attack and prepare a reasonable scientific explanation if our opinion is to hold up.

7.1.2 The seemingly cogent reasons to consider Signature B as false are as follows. The lettered observations correspond to the lettered arrows in the illustration.

A. The exemplars do not entangle the upper zone into the line above. Signature B does so.

B. In Signature 1, the final stroke of capital M is made to miss typewritten words beneath it.

C. The second hump of Capital M is not lower than the first and the third is higher, contrary to Signature B.

D. In Signature 2 we have no retracing in Capital M, whereas Signature B has deep retracing.

E. The initial strokes of capital M in Signatures 1 and 2 differ from that in Signature B.

F. The final down stroke of Capital M in the exemplars extends the lowest of any stroke, but in Signature B the initial stroke extends as low.

G. Capital W of the exemplars is more flowing and graceful than capital W in the questioned signature.

H. In Signatures 1 and 2 the final up stroke of capital W ends in a gracious in-curve, contrary to Signature B.

J. In the exemplars the second u-portion of capital W is significantly larger than the first, which is not the case in the will signature.

K. In the exemplars, the initial I is on the same base line as the first and last names, while in the questioned signature it is notably higher.

L. The final stroke of Wine in Signatures 1 and 2 is extended to the right and ends in a slight in-curve. In Signature B that final stroke ends abruptly.

This number of significant differences supports a finding that the questioned Signature B is most probably false.

7.1.3 Taking the Devil's advocate approach, let us assume that Signature B is most probably authentic and that there are enough significant similarities between it and Signatures 1 and 2 to support that finding. Therefor we must find those supportive observations which up to now we have missed. The numbered observations correspond to the numbered arrows in the illustration.

1. There appears to be a break, otherwise very light ink, in the Capital M. This seems to fit in with exemplar 1.
2. The endings on the capital M's match.
3. The form of small r fits well with the exemplars. These certainly are in no way divergent.
4. We see angular connections between small r and l, but garland connections between other letters. An excellent agreement.

5. The heights of the mid zone letters are the same.
6. The l-loops have the same proportion.
7. Ditto the e-loops.
8. The capital I is fully looped in the questioned signature, but that is in keeping with the movement that forms the exemplars. We should not be surprised if somewhere we find exemplars with the completed loop.
9. The period after I is placed and made similarly.
10. The overall form of capital W matches the second exemplar perfectly. The one question is the looping in the questioned signature. However, a close look reveals the exemplar has a tendency to looping.
11. The i-dot is placed and formed the same.
12. The small n matches the exemplar perfectly.
13. The heights of mid zone letters are again a match.
14. The endings in the questioned signature are the same gesture as in the exemplars, merely cut short.
15. We see tremor in the questioned signature, but also in the exemplars. The exemplars are slow and the questioned slower. So the original might show muscle tremor, while one would not be surprised if there is fine health tremor in all signatures.
16. The base line is the same in the last names.

At first blush, this array of similarities seems to outweigh our first list of dissimilarities. To resolve our perplexity, we have to address these questions:

Do the observations given in support of authenticity have further observable qualities that diminish or cancel their force as evidence? In other words, are they themselves reliable observations?

Are any of the notes used to support either identity or non-identity really not significant, might be considered as not sufficiently probative.

Are there further observations in support of falsity which we failed to make in the first examination?

Taking first the viewpoint of falsity and then the viewpoint of authenticity, can we offer reasonable explanations for the contrary similarities or dissimilarities which we could not previously dismiss as insignificant?

After answering the above four questions, should we downgrade the degree of probability of our opinion or should we change it altogether? After a reliability check brings up so many problems, we cannot hope to upgrade the degree of probability without more and better exemplars. In this illustrative case, we assume that no other exemplars are now available.

7.1.4 What can challenge the reliability of the observations in support of authenticity?

7.1.4.1 The most obvious challenge is the uncharacteristic size of the capitals in Signature B and the large figure of eight superimposed on Merle.

7.1.4.2 The next most obvious challenge would be the notable narrowness throughout Signature B as compared to Signatures 1 and 2. The opinion must address that fact and offer a reasonable, scientific explanation.

7.1.5 Which observed notes are truly significant?

7.1.5.1 Addressing the original opinion in favor of falsity and still acting as Devil's advocates, we can point out that observations about capital letters are not significant, if not in themselves then at least of far less significance than observations made of the small letters. It is a basic principle of handwriting identification that inconspicuous features are more significant than conspicuous features. In support of that principle, research has shown that one making an

imitation forgery will make capital letters pictorially correct while small, mid zone letters will most often be pictorially incorrect.

7.1.5.2 Addressing the adverse opinion of authenticity, the argument about capital letters becomes a two-edged sword. An opponent cannot reasonably deny our reliance on observations about capital letters and then put forth his own reliance on observations about them.

7.1.6 Can we make further observations supporting falsity?

7.1.6.1 The capitals letters are larger in proportion to the height of the small letters.

7.1.6.2 We see looping in the questioned signature which we do not see in the exemplars, especially to start capital M and then in the mid-stroke of capital W.

7.1.6.3 Narrowness is the most obvious difference in the questioned signature, both narrowness within the small letters, between them and between words.

7.1.7 In support of falsity, are there reasonable explanations for the similarities? We would have to reply at least to the most significant, to those least likely to be within the ability of a supposed forger.

7.1.7.1 The small letters seem to be ordinary forms taught in the school model and thus common to many people.

7.1.7.2 The angular connections could be caused by the narrowness rather than personal habit, since the less space one takes to make a turn the more angular that turn necessarily becomes. The height of small letters and the proportion of the loops are also a class characteristic.

7.1.7.3 The period after initial I is not placed similarly, since it should be considered in relationship to the initial I, not in relation to the last name or the base line.

7.1.7.4 Gestures are not to be considered similar if they begin the same but one is cut short and the other prolonged.

7.1.7.5 An appeal to tremor must be clearly demonstrated, and that was not done.

7.1.8 In support of authenticity are there reasonable explanations for the dissimilarities? As above, we would have to reply at least to the most significant, to those least likely to be within the range of Ms. Wine's proven graphic characteristics.

7.1.8.1 Since Ms. Wine died soon after the time Signature B was made, we hypothesize deteriorating health. Pain can cause contraction of the muscular movements and thus narrowness of the questioned signature. Under certain medications a person will elevate certain graphic gestures, such as the heightened capitals and raised initial I.

7.1.8.2 Contrary to the argument given above, the same graphic gesture allows for pictorial differences when the gesture is inhibited, such as by pain or hesitation, as opposed to being allowed its usual full expression. Thus, though pictorially different, the same graphic habit can account for beginning and ending strokes of both exemplar and questioned signatures. Along that same line, the looping movement to start capital M of the will signature could have well been done above the paper in the exemplar signatures.

7.1.8.3 Regarding tangling, the exemplars do not have the same constraint of available space that the will signature has. Also, the final on capital M of Signature 2 does run into printed matter.

7.1.8.4 Some of the observations in favor of falsity are couched in terms indicating value judgements or poetic descriptions. Stated in simple, objective terms these same differences do not appear so dramatic and thus so significant. So eliminate "flowing and graceful" and "gracious in-curve" and the observations are of ordinary handwriting compared to ordinary handwriting.

7.1.8.5 Relative height of humps in capital M is not a significant feature, as shown in Sub-part 7.1.5.1.

7.1.8.6 There is retracing in capital M of Signature 1, so its appearance in Signature B is not significant for non-identification.

7.1.9 Should our original opinion be altered?

With the array of cogent arguments on both sides of the issue, we would be imprudent not to make some adjustment in our opinion. Maybe we should have to state "probably false" at the very most. Since the insignificant features weigh equally, if not more than equally towards authenticity, we might best be advised to state "indications are" towards the opinion we now most favor.

Our reliability check has shown that the most definite thing about our original opinion is that it is impeachable. Remember, if we state the truth so imprudently that our reasons or reasoning is impeachable, the fact finder would tend to take that as proof that the contrary is in fact the truth. What do we need in order to arrive at a defensible expert opinion, indeed the proper expert opinion one way or the other?

7.1.9.1 Due to the impasse we have arrived at, if no other exemplars are submitted for examination except the two provided and only the copies are available, the presumption of the law seems to be that the authenticity of the signature must be upheld, for there is no preponderance of evidence favoring falsity. We need first of all an extensive a number of exemplars as possible and to arrange them in chronological order.

7.1.9.2 We would request access to all originals of all writings submitted for examination and of all other exemplars. Since our assumption is that such are not now available, we must at least downgrade the statement of probability.

7.1.9.3 We would ask for data on Ms. Wine's medical/medication history during the period of the exemplars and questioned signature. Again, if that is not forthcoming, we have another imperative to downgrade the probability of the opinion.

7.1.9.4 Finally, as much as legally allowable, we would like to see copies of all reports, declarations, testimony and other materials generated by other document examiners in the case, whichever party obtained their services.

7.2 THE CASE OF THE UNFORESEEN FORECLOSURE: EITHER/OR REASONING AS A RELIABILITY TEST.

Please make a gigantic supposition. On the following page are enlarged copies of five signatures. The top two are authentic exemplars. The middle two are the questioned signatures from a quit claim deed. The bottom signature is that of the public notary who solemnly attested to the authenticity of the deed signatures. The Browns' residence is being foreclosed because of non-payment of the second mortgage secured by the deed. They claim absolutely, positively they never had any knowledge whatsoever of the deed.

Contrary to all your initial instincts and to my initial pledge to use only ambiguous samples, your gigantic supposition is that we have arrived at the expert opinion that those deed signatures were definitely authentic. We have not yet made a report to the client. We want to test the reliability of our opinion, so we take the position of a cross-examiner using a series of either/or questions. Thus each sub-part will present a different disjunctive argument and the resulting question and answer series. As much as possible, some commentary and the trap in the alternative not taken will be given in parenthetical remarks.

7.2.1 CROSS-EXAMINATION BY MS. OPPOSING ATTORNEY. Mr. Expert, let me call your attention to the capital J of the deed signature. You stated that one of the reasons which indicate that signature is genuine is that the capital J is connected to the following small letter o. Look at the two loops on the capital J.

Q. Is the top or bottom loop connected to the small letter O? (Notice there is no third alternative; as in all such questions we must have a complete disjunction. There being no connection from capital J to small O is not an alternative, since the expert already admitted there was one in the fictional direct testimony which is not given here.)

A. The bottom loop. (If the answer were the top loop, such a blatant misobservation would totally impeach the expert.)

Q. Now look at the capital J of the exemplar signature. Does the top or the bottom loop connect to the small letter o?

A. (After some hemming and hawing.) The top loop.

Q. Doesn't that mean that the questioned capital J is made in the order and direction taught in school, while the exemplar capital J is made in the direct opposite way and is thus very individualistic? (A poor disjunctive question, because it is very compound, yet still a kind of one, since the either/or is implied. However, in closing in for the kill we can use a compound question rhetorically, provided each element is absolutely unassailable. If one element can be disproved by the opponent, the whole argument is rhetorically defeated, although it might be logically and scientifically cogent. For the languishing opponent to challenge unassailable elements of our compound disjunctive question only prolongs his demise and underlines our case's invulnerability.)

A. Yes. (Denial would be even more devastating; hedging the answer with something like "It seems to appear so" would indicate intellectual dishonesty, even if that is far from the truth; and no answer at all would imply total defeat.)

7.2.2 FURTHER CROSS-EXAMINATION BY MS. OPPOSING ATTORNEY.

Mr. Expert, you discussed the indicia of forgery in your direct testimony. You said a correcting stroke was one of these indicators of possible forgery. You also said that correcting strokes would actually be proof of forgery only if authentic exemplars did not have the same type of correcting strokes. (The expert cannot later demure on premises he himself established.) I draw your attention to the final of the initial E of the deed signature.

Q. Would you consider the stroke added at the end of the initial E to make it longer a correcting stroke or not?

A. It could be so considered. (If it is denied, then if making a short stroke to look like a longer stroke is not a correction, what possibly would be? The expert would be required to describe all kinds of correcting strokes until sooner or later he comes around to the kind that corrects short strokes into long ones. It is easier to take nasty medicine right off rather than prolong it and be forced fed. On the other hand, the hedging gives hope of finding a way out later.)

Q. Do you consider this stroke that makes the end of this capital E to be as long as his usual E's, instead of shorter, to be a correcting stroke or not? (The cross-examiner walls off any avenue of possible future escape.)

A. Yes. (After all, everyone else in the court room does so by now, so the expert had better join them if there is to be any hope of winning them over later.)

Q. Can you or can you not show me a correcting stroke somewhere in the exemplar signature? (A kind of either/or question that attacks the expert's competence as an accurate observer, rather than focus merely on the objective fact. Since there are none, the expert must agree the correcting stroke is a dissimilarity of significance. Again he is walled in.)

A. I do not see one.

Q. Let us turn to another indicator of forgery you mentioned. (The cross-examiner covers each applicable indicator of forgery in the same manner and then asks a devastating question.)

Q. When a handwriting expert sees all the indicia of forgery which we have seen in the questioned signature and does not see them in the exemplars as we have also just seen and yet does not consider the authenticity at least doubtful, would you say such an expert is competent or incompetent?

7.3 THE SAME CASE: REDUCTIO AD ABSURDUM AS A RELIABILITY TEST.

7.3.1 In order not to be accused of sexism, this time I will make the poor badgered expert a woman and the opposing attorney a man. We will focus on the Ruby Brown signatures. Imagine that our planned testimony is to the authenticity of the deed signature allegedly made by Ms. Brown. We used a series of exemplars, but the cross-examiner brings forth another undoubtedly authentic exemplar. The questioned signature and the exemplar are shown on the following page.

CROSS-EXAMINATION BY MR. OPPOSING ATTORNEY. Q. Ms. Expert, you stated that the initial stroke on the capital R was significant for identifying the deed signature as authentic. You said the up-curve and the angle formed by a line drawn from its start to its finish were significant features. I show you an exemplar which has been stipulated as being Ms. Brown's authentic signature. This exemplar doesn't fit both those features enough to be called authentic, does it?

A. It definitely does. (The expert is lulled into thinking she has just bested the cross-examiner.)

Q. Looking at the capital R of the deed signature, does the blunt start also qualify as a significant feature? (Notice each question leading to the reductio ad absurdum requires one of only two possible answers: Yes or no.)

A. Yes. (If no, the expert will be shown to disagree with authoritative authors and treatises, and so will have to change the answer later.)

Q. Does the fact that the initial stroke touches the body of the letter a fourth way from the top, that is at the mid point of the buckle, make for a significant or insignificant identifying note?

A. That could prove significant.

Q. You said that the way the final of the R ends below the line in a point is also significant, right?

A. Yes.

Q. In the new exemplar I have shown you, does the initial stroke start with feathered pressure or not? Have a little hook or not? Does it meet the body of the letter at the bottom of the buckle or not? Does the final stroke have a more feathered pressure and angle back to the left more than in the deed signature? (Actually each of these observations would be asked one at a time.)

A. Yes.

Q. Since you earlier agreed that the differing traits in the deed signature were significant for identification and since you said the deed signature was authentic, do not these significant differences indicate that the authentic exemplar might really be false?

A. No, because we need a combination of such things to have a reliable indication one way or the other.

The cross-examiner wants exactly that answer, for it prepares the way for the further absurdities as the differences found in each letter are explored in the same way. After each one, the expert is asked whether or not the significant differences are yet meaningful. The very question implies an absurdity in the expert's use of the word significant. At some point the expert will look foolish in denying falsity or be forced to accept the opposing opinion.

To avoid embarrassment like that, we alter our opinion before reporting and ascertain that we are indeed privileged, consultant experts, not subject to discovery and examination by the opposing attorney.

7.4 THE CASE OF THE PERFECT EXEMPLAR: TESTING RELIABILITY BY TESTING ASSUMPTIONS.

7.4.1 On the next page are enlarged copies of signatures from an actual court case. The exemplars are numbered one through five. The questioned signature is noted as such, and is on a contract granting substantial benefits to our client. The opposing party has denied the signature and thus the legal liabilities depending on it. Our initial assessment is that the questioned signature fits within the range shown by the exemplars, all of which have been supplied by the client.

7.4.2 We notice that exemplar three is the key exemplar, for it provides the closest match to all features in the questioned signature. In fact, it could be switched with the questioned signature and our problem would hardly be altered one bit. If it had not been given to us as an exemplar, would we have just as much trouble establishing its authenticity as we would then have authenticating the questioned signature? What assumptions have we made of it and our other exemplars?

7.4.3 The first assumption is that the client has indeed supplied only authentic exemplars. We also have assumed that all these exemplars can be properly authenticated as admissible exemplars. Recognizing those assumptions, we ask the client the source of each exemplar. Number three came from an unwitnessed insurance document. It seems that the opposing party has not relied on that document in any way. We must not rely on that exemplar unless our client's attorney assures us it can be shown to be admissible. If it is inadmissible, all our reports and exhibits based on it will also be inadmissible. Identifying our unstated assumptions has warned us of a potentially damaging problem.

7.4.4 A historical note. The samples are from an actual trial. After both experts testified and left, the party allegedly making exemplar three took the stand and denied it. The better procedure would have been for the attorney of the denying party to challenge the exemplar when first produced as an exhibit and demand it be authenticated and proven admissible.

7.4.5 It is amazing how parties at a hearing seem to accept each other's exemplar writings on the word of the expert. Then they do battle over the comparisons and interpretations founded on those exemplars. When first taking a case, I ask myself questions about submitted exemplars so that I can be reasonably certain there are no problems about admissibility, recognizing that the final determination is the

province of the attorney.

It is my obligation, while avoiding even the appearance of playing attorney, to bring to the attorney's attention any indications of difficulties in my area of the case. Additionally, I examine the submitted exemplars critically to see whether or not, based on the graphic features, there is anything questionable about their authenticity. That way I avoid making assumptions about the rightness and reliability of what the client presents to me.

7.5 THE CASE OF THE LOVING HEIRESS: TESTING RELIABILITY THROUGH AN ALTERNATIVE SUSPECT.

On the following four pages appear samples taken from my publication, *Forgery: Detection and Defense; a Guidebook for the Legal Professional*. Exhibit A is the questioned document. It is allegedly a holographic will written by our client's deceased husband, who died in the arms of his mistress. We have examined it and arrived at the conclusion that it is not only false, but also that it was written by the mistress' secret lover. His exemplar is Exhibit B.

To test our opinion, we examine exemplar writings from the other two suspects and compare them to Exhibit A. Exhibit C is by the mistress' mother, who wants the best for her baby. Exhibit D is by the mistress' landlord, who desperately needs her to pay a year's back rent. The mistress herself is not a suspect, since literacy is not to be found among her many charms and accomplishments.

Assume that there is no doubt that the deceased husband did not write the will. Our client wants to know if either mother or the landlord did so, since, unlike the secret lover, they are solvent and might be open to a civil suit for fraud and forgery. Also assume that there are definitely no other possible suspects than these three.

Sub-part 7.5.1 gives our cogent reasons for concluding that the secret lover definitely wrote the will. Sub-part 7.5.2 tests whether or not Exemplar C definitely proves that mother did not write it. Finally, Sub-part 7.5.3 tests whether or not Exemplar D definitely proves that the landlord did not write it. If the latter two do not provide definite proof of non-identity, we must re-examine Exemplar B to ascertain whether or not we overstated our case.

7.5.1 In support of the conclusion that the secret lover definitely wrote the questioned will, we make the following comparative examination.

7.5.1.1 We first note the indicia of forgery which appear in Exhibit A.

A. The questioned will resembles, but is not exactly like, the deceased's genuine writings, which are not reproduced here.

B. The writing movement is slow and careful for the most part.

- C. There is a lack of fluency in curved strokes; instead, we see obvious awkwardness.
- D. There are some restrained movements, such as hesitations and a few retracings.
- E. Many areas have unvaried pressure.
- F. Most beginning and ending strokes are blunt.
- G. Gross tremor appears in virtually every word.
- H. We see pauses within the writing line.

Though these indicia of forgery will not assist in identifying the writer, they will provide us with a reasonable explanation for differences between the questioned writing and the exemplar from the person whom we identify.

7.5.1.2 We now identify significant writing traits in the questioned will. Since the writing is unnaturally slow throughout due to the many indicia of forgery, we cannot rely on habits of speed for identification. Similarly, since after speed pressure is the most impaired category, only words written fluently would indicate the genuine pressure pattern of the writer. Thus our observations will cover only six of the categories of handwriting features.

A. ARRANGEMENT. The left and top margins are almost equal, and the right is a bit wider on the average. Word spacing is almost as consistently precise as an organic movement can be, but it opens up towards the end of the document. Line spacing is just wide enough so that upper and lower zones of neighboring lines do not overlap, except for one occasion.

B. FORM. The overall form, and the specific form of many individual letters, compare well with the deceased's authentic writings, which are not shown here. Upper loops show the most awkwardness in form, so we can hypothesize they are not usual for the writer.

C. CONTINUITY AND FORM OF CONNECTION. The greatest tremor and some angular pauses appear in connecting strokes. We would expect the writer to have a greater tendency to disconnection. Some straight line

connecting strokes are without tremor, as "o" to "d" in "understood." Some garlands are made fluently, as in "all" and "Jane," while most garlands show muscle tremor. The letter spacing within words is quite even.

D. SIZE AND PROPORTION. Mid zone height is consistent throughout. Those mid zone letters which do not show tremor or awkwardness tend to be narrower. The extension of the upper and lower zones tend to be more than double the height of the mid zone letters.

E. SLANT. The slant pattern is consistent.

F. BASE LINE. Generally, the base line is consistent. However, some ends of lines show an ever so slight arching downward. Either the writer has a habit of planting the elbow or does so here due to concentration on the act of imitation.

We would expect most, if not all, of the traits observed as consistent or fluent to be genuine traits of the actual writer. We could have made many more observations, but the above will serve to illustrate how we are to make the comparative analysis and the reliability check by consideration of alternative suspects.

7.5.1.3 In actual practice we would make observations of the exemplar writing a separate step, and then in another separate step we would compare the results with those from the questioned will. To save time and space and not tire the reader's attention, the significant traits observed in Exhibit A will be directly sought in Exhibits B, C and D in turn. But do remember that doing so in actual practice could well blind us to evidence which contradicts our final opinion. In other words, such a practice could possibly bias us. But let us proceed with comparative observations between Exhibits A and B.

A. ARRANGEMENT. In Exhibit B the top, left and right margins are the same as those in Exhibit A. The average word spacing is wider in Exhibit B, but it has the same variation of widening in the last lines. Line spacing is such that the exceptionally long extensions of upper and lower zones do not overlap.

B. FORM. Overall form and the specific forms of many individual letters

compare well between Exhibits A and B. In Exhibit B only "all" has upper loops, which is the only place where they appear fluently in Exhibit A.

C. CONTINUITY AND FORM OF CONNECTION. Exhibit B shows a greater degree of disconnection, and the connections which it does have fit with those in Exhibit A which lack tremor. Also, in Exhibit B we see mostly evenness of spacing between letters within words.

D. SIZE AND PROPORTION. Exhibit B shows the same height and consistency of height for mid zone letters as does Exhibit A. The letters in Exhibit A showing narrowness and lack of tremor are narrow in Exhibit B. Upper and lower zones in Exhibit B are two to three times the mid zone.

E. SLANT. We see the same consistent slant in Exhibit B as we saw in Exhibit A.

F. BASE LINE. The base lines of Exhibit B are consistent, except for the slight arching found in Exhibit A. That arching can be credited to concentrated effort at imitating the genuine writing of the deceased.

With those correlations in every category which could be used and with reasonable explanations for significant differences, we conclude that the secret lover definitely wrote the questioned will. Note that we do not rely solely on comparison of form or shape of letters and combination of letters. We could well use such to illustrate the correctness of our opinion and assist the untrained person to see the truth of the matter, but our opinion is not founded on such superficial similarities. We thus can have great confidence in its correctness, while at the same time we prudently proceed to make the reliability check.

7.5.2 We now make the same comparative examination between Exhibit A and Exhibit C, the mother's exemplar.

A. ARRANGEMENT. The top margin in Exhibit C is a bit tight, while the word spacing is uneven, an unevenness without a discernable pattern. The line spacing is proportionately wider than in either Exhibit A or B, when viewed solely from the aspect of the distance between the extremes of upper and lower extensions in neighboring lines: About the full height of the mid zone is left between the "y" of "really" and the "ll" of "all."

B. FORM. There is scant similarity of form between Exhibits A and C. Some examiners would simply rely on that fact, and thus they would support a correct opinion with impeachable premises. Any expert, who bases an opinion only upon comparison of shape and style of letters and strokes, can be impeached whether or not the conclusion is correct.

C. CONTINUITY AND FORM OF CONNECTION. Since mother uses garland-like connections and no straight line connections, she cannot be the writer of Exhibit A who had so much trouble with garlands and did so well with straight lines. Also, mother shows almost unrelieved connection of letters within words and makes them narrow and a bit uneven in spacing.

D. SIZE AND PROPORTION. In Exhibit C mid zone height varies in every word, even if there are only two mid zone letters. See how there is a slight difference between the heights of the first and succeeding strokes of "m" in the second "my." Exhibit C shows greater narrowness and much more retracing than does Exhibit A. Upper and lower extensions barely average twice the height of the mid zone.

E. SLANT. There is a slight change in slant throughout Exhibit C.

F. BASE LINE. Exhibit C shows a slightly rising base line with a bit of unevenness which is more apparent in the last line of the text. At the same time many words show a definite drop of base line for the final letter. These are features Exhibit A does not show.

We can therefore conclude that mother definitely did not write the questioned will. So far so good: Our opinion holds up. We now proceed to the third suspect.

7.5.3 The landlord's exemplar is shown in Exhibit D. We once again make a comparative analysis in the same exact order. If we follow the same procedure in each examination we make, we are less likely to skip an important observation and more likely to grow in mastery of our craft.

A. ARRANGEMENT. The top, left and right margins in Exhibit D are a bit narrower than in Exhibit A. Word spacing is wider at the beginning and narrower towards the end in Exhibit D, the opposite pattern from Exhibit A. Line spacing is narrower towards the end also, though zones do not overlap.

B. FORM. The overall style and specific forms for letters do not match. Except for "f" in "wife," Exhibit D shows no stick forms.

C. CONTINUITY AND FORM OF CONNECTION. There are few disconnections in Exhibit D. Light ink lines make the copy appear to have more disconnections than the original does. What appears to be straight line connections are really what are called threads, such as in "v" to "e" in "never." There is unevenness in the shape and length of connecting strokes. All these are dissimilar to Exhibit A.

D. SIZE AND PROPORTION. In Exhibit D mid zone height is decidedly uneven. Lengths of upper and lower zone extensions also vary.

E. SLANT. Slant also varies even more than it did in Exhibit C. Certainly such a writer could not maintain the consistency found in Exhibit A.

F. BASE LINE. The writer of Exhibit D has a varying base line. Most characteristic is that letters jump off the base line, such the second "o" in "understood" and final "s" of "mistress." Garland connections dip into the lower zone rather than staying on the base line. For example, see "i" to "f" in "wife" and "l" to "o" in "beloved" where the copy washes out the light line of the original.

We conclude that the landlord definitely did not write the questioned will. Thus we have proven the correctness of our original opinion, because there are no other suspects who could have possibly written the questioned will. As a consequence, the landlord will have to write off a year's rent, the secret lover will have to find either a job to support the mistress or a rich lover to support himself, and the mistress will have to move in with mother until she finds another source of food and shelter. And once again mother must suffer disappointment in her baby's fortunes.

7.6 THE CASE OF THE DENIED ENDORSEMENT: RELIABILITY TESTING WITH THE CONDITIONAL SYLLOGISM.

On the next page appear the two exhibits for this case. Exhibit A is the questioned signature of endorsement which made a benefit check payable to the defendant. Exhibit B shows exemplars of genuine signatures by the plaintiff, and comprises all such signatures available to the defendant at the time of the questioned endorsement. Plaintiff denies having made the endorsement and maintains that defendant forged it.

Our client is the defendant in a civil case. Defendant claims that plaintiff made the endorsement while defendant hand-held the check on a manila file folder. Plaintiff has the burden of proof, which is to prove with a preponderance of the evidence that the questioned endorsement is false. Thus we need only demonstrate that the handwriting evidence will not support such a proof.

Yet, if we can legitimately prove that the preponderance of evidence, or at least the weight of indicators where proof is not possible, favor genuineness over falsity, defendant can prevail. As long as we make correct observations, follow proper procedure and apply valid principles of interpretation, we are acting competently and ethically. If we were to sell our skill and knowledge merely to confuse the issue in support of a litigant's position, we would be inexcusably unethical.

Our opinion is that the plaintiff probably wrote the endorsement and that the significant differences in the endorsement are reasonably explained in two ways. First, plaintiff's exemplars show great variations among themselves. Second, the defendant's scenario for the signing of the endorsement accounts for the most notable differences between the endorsement and those consistencies observed as common to the exemplars. Our probable identification is based on the fact that consistencies observed among the exemplars appear in the endorsement, except for the problems caused by writing on an unsteady surface held by another person.

For illustrative purposes, assume that all facts represented in this introduction to the case are stipulated, unchallenged facts. The reliability test by use of the conditional syllogism will consist of the following parts: 7.6.1 gives the variations and consistencies which were observed among the exemplars; 7.6.2 through 7.6.7 give conditional arguments which we make while acting as our own cross-examiners, along with the reply that satisfies that challenge.

Finally 7.7 briefly illustrates how the traditional hypothetical question could be used to challenge the expert opinion. This is done in order to show how the hypothetical question used in cross-examination both differs from and incorporates the various types of reasoning which have been discussed.

7.6.1 The following are the major variations and consistences which can be observed in the exemplars, Exhibit B. The reasoning for arriving at the opinion of probable genuineness is not given to conserve writing space and reader time.

7.6.1.1 Variations: Both cursive, block capital print and script styles are used; size changes; proportions change both regarding width as to height and one part of one signature to the same part of another signature; i-dots vary; small r is made both school model and tent form; there is a major slant change to vertical in one signature, while there are small slant changes within each signature; different signatures are written with different speeds, and the speed changes within signatures.

7.6.1.2 Consistences: Base lines are even; most exemplars show the same major slant; angle values stay within a range; capitals have the same proportion; garland connections are dominant when there are connections; pressure is unvarying; that each signature has its own individual traits is a consistent habit.

7.6.2 First conditional argument against genuineness.

7.6.2.1 ARGUMENT: If the exemplars were written under different conditions than the questioned signature, then the exemplars are not comparable. But they were written under different conditions, therefore they are not comparable. The major premise is proven by the defendant's own contention that the endorsement was written on a manila folder held by another person. No exemplar was so written. The conclusion necessarily follows because the literature states exemplars written under notably different conditions are not comparable.

7.6.2.2 REPLY: The exemplars are comparable for parts of the endorsement which are not distorted by the condition. Additionally, they serve to help us determine both the undistorted and distorted parts.

7.6.3 Second conditional argument against genuineness.

7.6.3.1 ARGUMENT: If the exemplars are not of the same type signature as the endorsement, they are not comparable. But they are not of the same type, therefore they are not comparable. The major is proven in two ways. First, no endorsement signature appears in Exhibit B. Second, the style of writing among the exemplars varies as defendant's expert noted, so signatures using alternative styles are not comparable controls. The conclusion follows necessarily because once again the pertinent literature states that principle.

7.6.3.2 REPLY: There are degrees of comparability. We may compare an exemplar with the questioned signature to the degree it is comparable, as long as we do not make an invalid comparison. Otherwise we could never have any comparative exemplar, for the simple reason there is always some difference in the making of the exemplar versus the questioned. That reply effectively answers both reasons given to prove the major.

7.6.4 Third conditional argument against genuineness.

7.6.4.1 ARGUMENT: If there is not a sufficient quantity of exemplars, then a reliable conclusion cannot be reached. But there is not a sufficient number of exemplars, therefore a reliable conclusion cannot be reached. The major is proven by the literature which generally holds that twelve exemplars are the minimum required, with special circumstances calling for significantly more.

7.6.4.2 REPLY: The minimum number of exemplars required either in normal or special circumstances has to do with the degree of certitude in the opinion, as well as its reliability. The opinion was highly qualified precisely because of those and other limitations we already recognized. Additionally, these arguments mitigate as much, if not more, against the opinion supporting falsity. Thus they cannot be said to attack only the bases for our opinion.

7.6.5 Fourth conditional argument against genuineness.

7.6.5.1 ARGUMENT: It is an observable fact that in the questioned signature both first and last names are in two parts, with a clear demarcation between them, whereas the exemplars do not show that feature. If this is so, then it is a major indicium of forgery. But it is so, therefore it is a major indicium of

forgery. If a major indicium of forgery appears in the questioned but not the exemplar signatures, then the questioned signature is forged. But that major indicium of forgery appears only in the questioned signature, therefore the questioned signature is forged.

7.6.5.2 REPLY: We acknowledge the factual observations. However, several indicia of forgery must appear together in the questioned and not in the exemplars for the conclusion to follow. Additionally what is taken to be an indicium of forgery is reasonably explained by the hypothesis that the defendant's version of the matter is true; that is, the signature was written on an unsteady surface held by another person.

7.6.6 Fifth conditional argument against genuineness.

7.6.6.1 ARGUMENT: If the defendant did not copy plaintiff's signature but simply wrote it freehand, then the signature would appear the way that it does. But that is exactly how it appears, therefore the defendant wrote it freehand.

7.6.6.2 REPLY: We could reply by attacking the violation of rules of logic. Since in that case the opponent would simply restate the argument in correct form, we make a substantive reply right off. The similarities between the defendant's writing and the endorsement are superficial, the most similar being use of printed capital S. On the other hand, the differences are quite significant; that is, the inconspicuous features are divergent.

7.6.7 Sixth and last conditional argument against genuineness.

7.6.7.1 ARGUMENT: If the defendant told you his version of the signing of the endorsement, then that biased your analysis from the start. But he did tell you his version, therefore your analysis was biased from the start.

7.6.7.2 REPLY: We approach each case as if the client could just as well be mistaken. At least forty percent of our examinations go against the position of the party retaining us. In each case we conduct a reliability test to be certain that we have not been mistaken, either through bias or through making a technical error in observation, testing, or interpretation.

7.7 HYPOTHETICAL QUESTIONS IN THE CASE OF THE DENIED ENDORSEMENT.

This will give samples of hypothetical questions which a cross-examiner might ask of experts on either side. A few major points about hypotheticals will be given. The intent is only to show the difference between the ways of argument which have been discussed and illustrated and the hypothetical question. The hypothetical proper is the statement containing the fact the witness is to assume is true for purposes of argument.

7.7.1 Generally the hypothetical question is put forth as follows.

7.7.1.1 The witness is asked to assume that something is true. It may be a specific fact, a given scenario in light of which the fact is to be examined, a theory explaining evidence in the case, or a scientific thesis.

7.7.1.2 The hypothetical is something the witness has not yet relied on or considered, or is the contrary of a fact or premise the witness used.

7.7.1.3 The witness is told not to address the believability or truthfulness of the assumption. It is to be taken simply as true for purposes of the questions to follow.

7.7.1.4 Then the question is asked as to what would result if the assumption is indeed true. The usual form is "Wouldn't it therefor be true to say...?" Attorneys also like to ask if it would be fair to say something.

7.7.1.5 The cross-examiner may lead the witness step-by-step through the logical series of connected conclusions, each building on the previous one.

7.7.1.6 Ultimately the witness is hopefully led to accept a final inference, the cross-examiner's position. That may be either a contradiction of the witness' original position or a position on an entirely different topic upon which the cross-examiner's case will rest.

7.7.1.7 Later, after the witness has been dismissed, the cross-examiner offers proof for the hypothetical. As a result, the witness for the opposing party is made to support, or at least appear to support, one's own contention rather than the contention which the witness was brought forth to establish.

7.7.1.8 Examples of how the hypothetical might work in the case of the denied endorsement follow. Only how they might begin is indicated. A full treatment of the hypothetical question, both how to employ and how to reply to it, would require another complete monograph. So consider the introduction given above as a cursory one and the examples given below as only illustrative.

Part 7.7.2 gives hypotheticals which could be asked of the expert maintaining falsity. 7.7.3 gives hypotheticals which could be asked of the expert maintaining genuineness.

7.7.2 Hypothetical questions for the expert maintaining falsity of the denied endorsement.

7.7.2.1 FIRST HYPOTHETICAL: Assume that the questioned signature is faster than the exemplars. If that is so, doesn't it follow that the endorsement is a genuine writing?

REPLY: If that were so, it would indeed be a genuine writing, but we would still have to prove whose genuine writing it is. However, it shows erratic speed, and so the assumption would not hold up to critical examination.

7.7.2.2 SECOND HYPOTHETICAL: Assume that any given exemplar is the questioned signature. Would not the differences between it and the other exemplars be as great as those differences between Exhibit A and those same exemplars?

REPLY: No, they would not be, because none of them show the breaks and extended endings found in Exhibit A.

7.7.2.3 THIRD HYPOTHETICAL: Assume that the breaks and endings in Exhibit A are due solely to writing on an unsteady surface, now would not the problem stated in the second hypothetical have full force?

REPLY: I would have to make the same full comparative examination which I made of Exhibit A in order to be certain, but I do not anticipate that being the case.

7.7.3 Hypothetical questions for the expert maintaining genuineness of the denied

endorsement.

7.7.3.1 FIRST HYPOTHETICAL: Assume that the defendant did sign on a manila folder held by another person. Combined with an effort at imitating the plaintiff's signature, would that not explain why that endorsement has differences from the defendant's exemplars?

REPLY: As stated previously, the insignificant features differ from the defendant's exemplar writings. With not just the problem of imitating another's signature but also the added problem of writing on an unsteady surface, a complex of indicia of forgery would necessarily appear. That is not the case.

7.7.3.2 SECOND HYPOTHETICAL: Assume that the defendant traced the endorsement from a genuine signature. Would that not explain similarities along with the separation of the first and last names into two parts?

REPLY: Tracing must match one of the signatures available to him. But there is no such match to any of the exemplars, which have been agreed are the only signatures which were available to him.

7.7.3.3 THIRD HYPOTHETICAL: Assume the defendant used several models in tracing the endorsement. Would that not explain the differences and the disjointed words?

REPLY: The opaqueness of the check safety paper would prevent any but the grossest tracing to be done. In that case several indicia of forgery would necessarily appear, and they do not.

SECTION EIGHT

SELECTIVE BIBLIOGRAPHY

8. SELECTIVE BIBLIOGRAPHY.

The citations given are to some of the works studied in developing the topics discussed in this monograph. Those that are most useful and instructive were selected. As stated in the preface, further relevant citations are contained in other publications I have issued and will be in future studies of topics related to this one.

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SECTION NINE

APPENDIX A: RELIABILITY IN INFERENCES

9. APPENDIX A: RELIABILITY IN INFERENCES.

On the next page appears a chart illustrating when or when not a fact may be logically inferred from another that has been conclusively proven. Of all possible questions which could be addressed, the discussion will be arbitrarily limited to four. Assume that the definitions given are valid for our purposes and that it is the same individual's signature which is questioned each time. The four questions are:

1. Is the signature genuine? A genuine signature would be one executed by the alleged author without any deliberate alteration from the usual, normal style. The term "authentic" should be reserved to indicate the legally valid, and the term "genuine" reserved to indicate the graphically genuine as defined here.
2. Is the signature false? A falsified signature would be one of the following:
(a) By the alleged author with some deliberate alteration from the usual, normal style; or (b) By a person other than the alleged author but represented as being by the alleged author; or (c) Whether with or without deliberate alteration from the usual, normal style of the maker, the signature is represented as being by either an unknown (anonymous) or fictitious (pseudonymous) writer.
3. Is the signature written by a specific person other than the alleged author?
4. Is this signature legally valid; that is, legally enforceable against the alleged author?

Please note carefully that there is a difference between asking whether or not a signature is graphically false and whether or not it is written by the purported author. Also, a signature can be legally binding and be written by another person or by the purported author in a false style. During the discussion some instances of these various distinctions will be indicated.

In the chart there are six separate situations represented by the six columns. The box with the "Yes" or "No" indicates what has been definitively proven in the hypothetical situation. Since the document examiner does not determine questions of legal validity, the "authentic" in the full sense, "Yes" and "No" do not appear in that row. The symbol consisting of a triangle of three dots stands for "Therefore" and means that that conclusion necessarily follows from the proven fact. A question mark indicates that that conclusion, whether in its negative or positive form, does not follow necessarily from the proven fact, but it must be proven independently.

	1	2	3	4	5	6
A. Genuine?	Yes	No	∴ yes	∴ no	?	∴ no
B. Falsified?	∴ no	∴ yes	No	Yes	?	∴ yes
C. By another?	∴ no	?	?	?	No	Yes
D. Legally valid?	?	?	?	?	?	?

Each hypothetical case will be taken in turn. The fact which is to be assumed as having been definitively proven is given first in each instance. Then follows discussion of what does and does not logically and necessarily follow from that fact.

9.1 In case one, represented by column one, it has been proven that the questioned signature is definitely genuine. It necessarily follows as a logical inference that it is not falsified, box B1, and not written by another person, box C1. There is no logical necessity that it be legally enforceable on the maker. For example, the terms of the agreement in a contract may not have been met by the other party or the document was falsified after the signature was written.

9.2 In case two, represented by column two, it has been proven that the questioned signature is definitely not genuine. We can conclude that it is falsified but not that it was written by another person. For example, if the person wrote his name in the usual normal style, it would not be a genuine signature if his style of writing his name differs from his style of signing his name.

Even if it is false as a signature, we still must prove whether or not it was executed by the alleged author or another person. In one well known book on document examination, the author illustrates a false signature along with genuine signatures used to determine the falsity. He states that the undoubted falsity proved that the signature was not written by the alleged author. However, the signature shows all the indications of disguise of signature by the alleged author through change of slant. So the examiner must prove each proposition independently, not take one as being inferred by the other.

9.3 In case three, represented by column three, it has been proven that the questioned signature is definitely not falsified. The necessary inference that it is genuine follows from that proof because of our working definition. Under a less stringent definition, it may not be falsified yet written by another person, if that person, using his own usual and normal style, simply wrote the alleged author's name. In such a case, it may or may not be genuine, and it may or may not be legally enforceable against the alleged author.

9.4 In case four, represented by column four, it has been proven that the questioned signature is definitely falsified. It cannot be genuine, since, even if the alleged author wrote it, it is not in the usual and normal style. We cannot conclude that another person wrote it, for as we just saw the alleged author may have written it in other than the usual and normal style. The falsified signature may or may not be legally enforceable. For example, if the alleged author wrote it himself in a falsified style, he might still be liable for the consequences.

9.5 In case five, represented by column five, it has been proven that the questioned signature is definitely not by another person. We still do not necessarily know simply from that fact whether or not it is genuine or falsified, even though it is also later proven that the alleged author wrote it. And once again we have the same possibilities of legal enforceability or unenforceability.

9.6 In case six, represented by column six, it has been proven that the signature is definitely by another person. We necessarily know that it cannot be by the alleged author. If we had a different working definition of genuine, it might or might not be in a falsified style, as when the writer uses his own usual and normal style in writing another person's signature. The possibility of the other person using his own false or genuine style is not allowed for in the chart, since it focuses on a narrow range of possibilities. And it may be legally enforceable, such as when one person gives another person permission to sign his name. Another such situation might be when, although the other person signed the alleged author's name without permission, still the alleged author acted on the instrument as if it were genuine or accepted benefits accruing to him from the instrument with that signature.

9.7 To summarize the major points made in this discussion:

9.7.1 Each proposition, which does not necessarily follow as an inference from another proven proposition, must be independently proven. At best we may hold the unproven proposition on some degree of probability, depending on what experience has demonstrated is the likely relationship of the two.

9.7.2 The document examiner must never, not ever, make any legal inferences from the evidence generated in the handwriting examination, no matter what experience has shown to be the likely correlation. To do such is unwarrantedly and inexcusably, and probably unethically, to infringe on the sole privilege and power of the court or to play attorney without a license.

9.7.3 If the document examiner makes an unwarranted inference, the opinion is impeachable, no matter how accurate it might be.

9.7.4 Only four questions are accounted for in the chart. There are many others, and each will most probably have no necessary correlation with what is proven about any other question, just as the plurality of possible inferences in the chart are shown not to be necessary consequences of the proven proposition.

9.7.5 The definitions of the terms we use make a big difference as to how we may or may not employ any given term in our opinions. We must learn to be precise in defining terms and circumspect in employing them.

9.7.6 This discussion underlines the necessity to make a reliability check of our examination and conclusions, the opinion with all its reasons and reasoning.

SECTION TEN

APPENDIX B:

HANDWRITING IDENTIFICATION:

AN ART OR A SCIENCE,

A SUBJECTIVE OR OBJECTIVE DISCIPLINE?

10. APPENDIX B: HANDWRITING IDENTIFICATION: AN ART OR A SCIENCE, A SUBJECTIVE OR OBJECTIVE DISCIPLINE?

There is much division of opinion both within and without the field of document examination whether handwriting identification is an art or a science, whether its conclusions are objective or subjective opinions, whether the probability estimates are objectively or subjectively founded. In this appendix I will state briefly what my opinion in the matter is and indicate some of the reasons why. This is by no means intended to be either a full representation of the ideas of others nor a full exposition of my own position. This is a topic I would like to address at length in another monograph.

10.1 Is handwriting identification a science and a scientific endeavor? If it is not, the pioneers of the discipline in America have wrought a fraud upon the courts of this land. It is because of their patient and clear exposition of their position that it is a science and a scientific endeavor and because of their successful performance in courts of law on that basis that court decisions accepted their discipline as a science worthy of credence.

Any member of the document examination community who maintains it is not a science and scientific endeavor must necessarily eschew the most honored of our predecessors and the standing in case law given to handwriting expert testimony. If you as a document examiner giving handwriting expert opinions do not consider that to be a scientific endeavor, then I for one can think of absolutely no reason why any court should qualify you to testify as an expert witness. That also brings up a question of personal integrity addressed later; charitably I hope.

10.2 Aside from the acceptance by the courts of handwriting identification as a science and scientific endeavor, can we legitimately hold such a view? Definitely. Contrary to the myth that to be a science a study must be of strictly mathematically measurable phenomena, I hold to the very sensible Aristotelian view about what makes a science. The keynote is that it is knowledge of a class of things under a specific aspect of their being, which knowledge is characterized by knowledge

through their causes. That is, what most characterizes a science is an understanding of things, a wisdom as to why they are as they are.

One may know many facts and have many mathematical measurements of those facts and have them all nicely ordered and organized, but if one cannot discover why they are as they are, one is far from being understanding and wise, and thus far from being scientific. Knowledge of mere facts, no matter how extensive and precisely measured, is common ordinary knowledge, not scientific knowledge. Handwriting science is precisely knowledge of handwriting as the product of human graphic motor function through an understanding of its causes.

10.3 Another very sensible Aristotelian concept is that different classes of things permit different types of certitude. Only mathematical things allow mathematical certitude, but they are not things existing in the objective and very real world out there, which existed long before ever a human being with a human mind, much less a mathematical outlook to that mind, existed. A mathematical thing per se is a concept, an abstraction of but one trait from the complex of traits belonging to physical entities: Their measurability.

When we consider the things depending upon human choice, of which handwriting is one, mathematical precision is limited by the very nature of this living, organic function. That is true of everything which derives from or is related to human life. Such a science should employ mathematics, but it can hardly be measured by it. Mathematics itself depends on non-mathematical laws and axioms for its validity. But that enters into epistemology, without which no science, including mathematics, can support a claim to being knowledge, much less a science.

10.4 Is handwriting identification an art? Most certainly. An art in general is any human activity resulting in some external product. An art attains to craftsmanship, that is to its most excellent form, by being rooted in a grasp of the appropriate science. Thus a sculptor in bronze will achieve greater artistry and craftsmanship by mastering the science of metallurgy relative to bronze. A sculptor ignorant of such metallurgy would make a terrible blunder sooner or later in the art of bronze sculpting.

So also, a so-called document examiner who has not mastered handwriting science will make incidental to gross blunders in the actual functions of handwriting

identification. Indeed, such practitioners are easily impeached by an attorney who has the services of one who has mastered both the science of handwriting and the art of handwriting identification.

10.5 Is handwriting identification an objective discipline and is its opinion founded on objective probability? Let us push the question even more deeply into the reality of a situation: Can the handwriting opinion be based on objective facts or is it merely based on subjective evaluation of data which is not objectively existent or at least not objectively verifiable? As I have demonstrated throughout this monograph, only two things can support a tenable handwriting opinion: Objectively observable and verifiable facts and objectively validated principles of interpretation. That kind of opinion alone can hold up under any valid verification process, especially cross-examination. So I believe those, who maintain their handwriting opinions are really subjective and not objective, are necessarily self-impeached.

10.6 Yet there is always a subjective element to any human judgement. Even the most rigidly mathematical scientist ultimately makes subjective judgements; that is, the judgements and consent to those judgements take place within the judging and consenting subject. The standard of values which the subject maintains as the valid guide for assenting to judgements is established and applied through a subjectively made consent. So the real question is whether or not there is an objective reality that justifies that subjective consent and will it stand up to a process of rigid objective verification.

Thus my opinion that someone wrote the questioned signature is a subjective judgement to which I consent by a subjective choice based on a standard of values which I have accepted as objectively valid. When I am challenged, I must be able to respond by demonstrating objectively observed and verifiable facts and by explaining objectively validated principles of interpretation. By such demonstration and explanation, I can convince the fact finder that to give consent to my opinion would be to render a subjective judgement based on and justified by objective reality. In a word, any opinion is subjective, while to be scientific the basis of the opinion must be objective.

10.7 One might argue that, as soon as I use a probability statement that is anything but

a precise mathematical number, I am giving a subjective probability. I would reply that "subjective probability" is a contradiction in terms, though I realize it is widely used and accepted. The belief is subjective, as all consent to any statement necessarily is. The basis for my consent may be objective or subjective.

If I simply do not like left-handed people, then any examination I make involving left-handed writers would probably be based on subjective reasons and be completely indefensible. Now, though free from such subjective reasons in rendering my expert opinion, the quality of the objective reasons upon which I base my subjective consent may leave something to be desired. Thus I recognize that my consent may be mistaken, though I definitely give consent to the belief and do not hold any partial belief in the contrary. My probability statement, whether numerical (such as "90% probable") or estimative (such as "very probable"), is an evaluation of the quality of the objective reasons, how they meet objectively established criteria for proof.

10.8 If someone sincerely believes that handwriting expert opinions are only subjective, that would explain why some experts freely take employment from either side of a dispute. That also explains why the expert feels ethically free to choose one set of principles to apply in one case and another set to apply in another case. If the very foundations of an opinion are strictly subjective as well as the consent to the opinion itself, one is perfectly free to defend any opinion in the matter. If one believes, on the other hand, the reasons for the opinion must be genuinely objective, then one can only take one side in any question, namely that which one considers best supported by the objectively verifiable data.

Let me offer an analogy for how I view objective vs. subjective handwriting opinions. The mathematical numbers given are merely for illustrative purposes, and as in any analogy it limps; so one must consider the analogy and not the limp.

10.9 If one were to believe a handwriting opinion is merely subjective, an undecided opinion could be illustrated by 50 on a scale of zero to 100. Zero would represent the opinion that the suspect definitely did not write it, while 100 on the other hand would represent the opinion that the suspect definitely did write it. However, since the opinion is completely subjective both in its consent and in its reasons, the expert would never be giving personal, complete consent to either proposition, but must logically entertain the notion that reality has no necessary connection to the evidence

and to the arguments put forth.

Then if the expert gives 60 as favoring the proposition that the suspect wrote it, the expert must logically say the other 40 points, by which the opinion is removed from "definitely wrote it," favor the proposition that the suspect did not write it. Thus the expert, if hired to do so, could ethically argue the 40 points favoring non-authorship. And if the expert places the opinion at 40, 60 points would favor non-authorship and the remaining 40 favor authorship. The expert again honestly maintains both contrary propositions, but to different degrees, while actually consenting to neither. Only at zero or 100 might there be actual consent to either alternative.

10.10 Let us look at another mathematical analogy to demonstrate a subjective consent based on objective reasons. Zero would indicate no opinion one way or the other. A positive number from 1 to 100 would indicate consent to the proposition that the suspect wrote it. The higher the number, the more the expert considers that the quality of the objective evidence can hold up under any challenge, from the technical requirements of the discipline through the technical requirements of the courts. Likewise a negative number would indicate the contrary in the same way.

At +100 the expert considers the identification undoubted and no longer subject to being in error, for there is nothing challengeable in the objective reasons. A negative number would indicate consent to the proposition that the suspect did not write it. As in the positive statement, the more secure the objective reasons the greater the negative number, until -100 would indicate a certain, unassailable, unimpeachable and virtually infallible belief. Only the most foolish of experts would give -100 or +100 in any but the most perfect of situations.

10.11 Let us look more closely at that second analogy. It does not allow for the expert to entertain the two contrary propositions, "The suspect wrote it" and "The suspect did not write it," except when the illustrative number is a zero. Once the expert steps to -1 or to +1, the expert consents to one or the other of the two

contradictory propositions. No rational person consents to two sides of a completely disjunctive and contradictory set of propositions.

Thus the expert who considers the expert handwriting opinion as being founded upon objective reasons cannot ethically and freely act for either party to a dispute, that is to maintain either of two contradictory propositions that the suspect wrote it and that the suspect did not write it. The expert can ethically maintain only that proposition which the objective evidence most supports.

10.12 Such an expert could ethically act as a consultant in advising the attorney on how to impeach the other kind of expert who maintains an opinion on objectively unverifiable grounds. If the expert's conclusion were right, although for incorrect reasons, I myself would not do such consulting service except in a criminal case. In that situation the constitutional rights of all of us are endangered if a defendant can be convicted on anything but evidence beyond a reasonable doubt. If the guilty can be convicted on the basis of constitutionally insufficient evidence, the innocent can be equally convicted on the same basis.

The matter would be entirely different in a civil case where the expert gave a correct conclusion but supported it with arguments which were not probative. In doing such consultant work to impeach such a faulty opinion, I personally would feel that I were morally cooperating in the unjust transfer of property or the unjust imposition of obligations on an undeserving individual. The possible personal gains from such an activity would only last the short time until one dies; one's conscience lasts a long eternity after one dies.

SECTION ELEVEN

APPENDIX C: RELIABILITY TESTING OF A HYPOTHESIS THROUGH PREDICTIONS

11. APPENDIX C: RELIABILITY TESTING OF A HYPOTHESIS THROUGH PREDICTIONS.

In Sub-part 3.5.2.6 I mentioned the making of a prediction based upon an expert opinion and upon the hypothesis it puts forth to explain the relevant facts. In this context a hypothesis is not meant as a statement of a proposed scientific explanation for observed phenomena, a tentative scientific theory. Rather it is meant as an explanation which accounts for all relevant facts in a specific forensic problem. It entails a scenario, a story or explanation if you will, of how events could have occurred to explain all the results which the expert can observe and verify. The elements desirable in such a hypothesis, as simplicity and singleness of cause, belong to a discussion of legal presentation and the convincingness of testimony. Here we are only concerned with technical elements from the narrow viewpoint of the discipline of handwriting identification.

If we have arrived at an opinion as to the maker of a questioned handwriting, we should, among other estimates, be able to predict what unseen but also proper exemplars from that same writer would show. Such predictions would enjoy a lower probability than the opinion from which they derive, simply because they are prognostications less directly supported by the evidence and more removed from the hard data and interpretative principles employed.

I did not include this possible reliability test among those treated in the body of the text for three major reasons. First I have not used it in that way. Second I have not thought it out beyond the point of merely being able to offer a theoretical description of how it might work. Third, since I do not believe it would ever approach being as categorical in its results as the methods discussed already, its nature makes it most risky to use in a legal setting. A cross-examiner would insist that only absolutely precise results would prove an opinion correct. We would be hard put to it to counter such an assertion. After all, we are examining a human expressive gesture which gives results that occur only for the most part and are never unalterably and precisely the same on any two separate occasions.

Yet this method is most necessary in primary research where we are establishing or confirming the principles of our science, that is, dealing with validity proper. With that judicious bit of hedging my bets, let me describe my tentative view on how this method of reliability testing might work.

11.1 Suppose that our comparative examination of the questioned and exemplar writings has established a hypothesis that explains all the pertinent facts. We identify X as the writer of both questioned and exemplar samples. We then predict: "If X made the questioned writing, future exemplars from X will show trait Y which we have not yet found in our exemplars, because of their limited number." We then search for those exemplars and make an examination of them.

11.2 If trait Y does indeed show up, we have successfully tested our hypothesis. If trait Y does not show up, we have a problem. We must do one of two things.

11.2.1 We can consider the evidence for X being the writer as still cogent, and so we revise our hypothesis to explain why trait Y did not appear in the new exemplars. We might discover X was ill when the new exemplars were written but not when the first ones were. So we hypothesize that health indicators have masked the expected trait Y. We predict that exemplars, which were written in the same good health in which our original exemplars were written, will confirm our identification of X as the writer.

11.2.2 If we consider the failure of trait Y to appear in the new exemplars as fatal to the apparent evidence of X being the writer, we abandon that identification and search for another suspect. We would hypothesize that the true suspect must have trait Y as an identifying note.

11.2.3 In either case we must again search for the proper exemplars to test our new or altered hypothesis.

11.3 When we consider a series of new hypotheses, each of them has its own peculiar predictive qualities, just as our original hypothesis had its own individual predictive qualities. But within the nature of the particular case and within the context of the problem that was posed to us by the client, any hypothesis must fulfill some specific predictions to be correct. This will be touched on a bit later.

11.4 Additionally, each new hypothesis must be able to run a gauntlet of tests. These tests would be those appropriate to the particular problem posed to us and which are supported by the established practice within the profession. Such standard tests would

be recognized for their proven reliability and the appropriate procedures for conducting them. They would be ranked in order of preference for usage and in order of reliability in addressing the specific problem investigated.

11.5 What makes a given hypothesis plausible, plausible enough to us as the experts investigating in order to inspire us to take it seriously, plausible enough to the client in order to convince the client to pay us to do the work, and plausible enough to the fact finder to accept our opinion as true? Such a question opens up an entire discussion on persuasion and presentational style, as well as on scientific and legal weight of proof. Suffice it to say that within our present context our discipline itself must give us reasonable grounds for considering the hypothesis worth testing.

11.6 What are the sources for establishing predictions for our hypothesis?

11.6.1 First the very nature of the specific problem might require it. So if two contracts made at the same date and time in two far removed places allegedly have the same person's signature, an opinion, which was formed after comparative examination and states that Contract One carries a genuine signature, necessitates the prediction that the same comparative examination will prove that Contract Two carries a false signature. If they are both definitely proven to be genuine, either the examination is faulty or the alleged dates and times are wrong.

11.6.2 A previously established thesis might require a particular prediction. This thesis may be derived from the science we practice, the applicable law in the case or the contentions of the litigants as to the facts at issue.

11.6.3 The very nature of the hypothesis itself might require certain predictions from a given opinion. Thus in an alternative suspect reliability test, any positive identification of a first suspect necessitates that the expert predict that consideration of an alternative suspect must result in a non-identification.

11.7 We can use any acceptable logical reasoning to establish our prediction. The major ones will be mentioned but not discussed at length, nor will they be illustrated.

11.7.1 We can use an either/or reasoning. The hypothesis necessarily must predict contrary results from the positing of two contrary premises.

11.7.2 We can use a conditional syllogism. In a way each of our illustrative conditional syllogisms required the one answering to consider what would result from a given condition; that is, make a prediction.

11.7.3 We might employ a deductive syllogism. An applicable scientific law is the major premise. The hypothesis we entertain is the minor premise. The resulting conclusion should be true and could be tested as a prediction.

11.7.4 Finally we could employ an inductive syllogism. Actually this is what we do when we establish our principles of interpretation. Observed data serve as the premise. The hypothesis itself is the conclusion, the theoretical explanation for the data. That theoretical explanation tells us where and how we should be able to uncover similar data. That constitutes a prediction.

11.8 What logical methods can we use to test our predictions?

11.8.1 Each of those listed in 11.7 above can serve to test as well as produce predictions.

11.8.2 The *reductio ad absurdum* is a fine test for predictions.

11.8.3 Most importantly, we can conduct primary research, collecting new data to see if it fits into our explanation. If it does not, we accept objective reality and alter our subjective belief, our hypothesis.

11.9 As stated earlier, I have not employed this method as a reliability test. I do employ it in three other ways. The first is that mentioned in Sub-part 3.5.2.6.

The second way is to form a basis for suspicion. For a most obvious example, if one sees indicia of forgery in a signature, by that very fact alone one cannot know for

certain whether the signature is false or genuine. By the quality of those indicia, such quality as would distinguish them from similar traits caused by factors other than falsity in writing, one can make a prediction concerning falsity. Exemplars more often than not verify the prediction. Such verification is absolutely no basis for taking a definite stance in similar situations that arise in the future. A prediction is only a tentative conclusion, and it would be foolish to accept it as an opinion, a conclusion to which one consents, particularly under oath.

The third way in which I have employed this predictive method is to formulate questions which one should ask in a situation. For example, t-bars made right to left can be an indication of left-handed writing, writing with the opposite hand, writing by a person with directional or perception problems, or a right-handed writer with an individual trait. Depending on the accompanying graphic traits, the right to left t-bar can be fairly accurately determined as being which one of those instances.

Thus in one situation I examined an exemplar and asked the attorney if the client who wrote it was left-handed. A phone call confirmed that estimate. But I did not assert that the client was left-handed; I certainly knew enough to ask. If a formal opinion had been required, I would have stated that it was probably so; "probably" because the handwriting principles involved allow for alternative reasonable explanations, but "was so" because the accompanying graphic traits sufficiently favored that interpretation.

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